United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015		
Project ID	**Project Name**	**FY Total**
AMES - Ames Laboratory		
FY2013-MAKl-0513	Demistifying the hydration layer on nano oxide in suspensions by liquid cell Transmission Electron Microscopy	$2,183
FY2013-VDOB-0909	Theory and Simulation of Solid-State Nuclear Magnetic Resonance for Characterization of New Materials	$116,297
FY2014-LOG-1212	Self-Healing Adaptive Structural Coatings	$16,357
FY2014-LWA-0413	Adsorption-induced Shape-changing in Nano alloys: Extended Alloy Wulff Construction with First-principles Calculations	$83,539
FY2014-SAD-0802	Sensitizers for Dynamic Nuclear Polarization Nuclear Magnetic Resonance Spectroscopy	$173,307
FY2014-SL0-0604	Customized Assembly of Catalytic Systems by 3D Printing Technology	$116,069
FY2015-CSTR-1218	Dynamic Whitelist Generation for Automated Intrusion Response	$161,930
FY2015-JCUl-2608	Improving Ductility of High-Silicon Electrical Steel	$4,075
FY2015-MPRU-0812	Studies of Novel Materials Using Dynamic Nuclear Polarization Nuclear Magnetic Resonance Spectroscopy	$130,632
FY2016-MTAN-0815	Development of a Novel Modular Thermal Conductivity Measurements Setup	$1,378
FY2016-RPRO-0815	Frequency-domain Magnetic Susceptibility Under Pressure and at Ultra-low Temperatures	$16,530
Total # of Projects for AMES: 11 **Total Cost for AMES:** $822,297		
Total Administrative Cost: $101,345		
ANL - Argonne National Lab		
P/ANL2012-205	Modeling the Interactions of Biophysical, Biogeochemical, and Microbial Dynamics in Permafrost-affected Soils: From Pore Scale to Regional Scale	$154,100
P/ANL2012-206	Developing, Improving, and Testing Methods for Predicting Spatial and Vertical Distributions of Soil Organic Carbon at Regional Scales	$189,200
P/ANL2012-209	Atomistically Informed Mesoscale Modeling for Advanced Electrical Energy Storage Systems	$329,900
P/ANL2013-013	Improving the Stability of Rubisco Activase, the Weak-link, In the Biological CO2 Fixation Machinery	$223,200
P/ANL2013-016	Spin-based Thermal Power Generation	$190,600
P/ANL2013-022	Super lubricious Carbon Films Derived from Natural Gas for Home-refueling Applications	$144,300
P/ANL2013-035	Extreme Opt mechanics, the ability to precisely measure the frequency at which mechanical oscillators vibrate	$199,300
P/ANL2013-036	Development of Near-Field Enhanced Terahertz Pump X-ray Probe Techniques for Ultrafast Control of Strongly Correlated Materials	$257,800
P/ANL2013-063	Visualization of Stress-induced Polarization Switching in Electromechanically Coupled Ferroelectric Polymers	$202,800
P/ANL2013-070	Imaging Ecological Engineers: A Novel Quantum Dots Approach to Map Microbes in Complex Soil Structures with X-rays	$248,800
P/ANL2013-080	Ultra-low Loss Superconducting Micro strip for Multi-chroic Cosmic Microwave Background Detectors	$229,500
P/ANL2013-100	3-D Compositional Control of Intermediate-Band Solar Cells	$228,900
P/ANL2013-111	Feasibility Study of Applying Thin Film High-Temperature Superconducting Films on Copper or Niobium-Sputtered-on-Copper for the Purpose of Achieving Helium-Free Operation with Cryocoolers	$340,800
P/ANL2013-116	Nanolaminate Coatings for Improved Nuclear Fuel Cladding Performance	$187,600
P/ANL2013-148	Development of Predictive Multi-dimensional Combustion Modeling Capability with Detailed Chemistry	$376,700
P/ANL2013-152	Nanolaminate Materials for Extreme Environments - A Demonstration of Argonne Capabilities for Design, Synthesis and Accelerated Testing of Radiation Tolerant Nuclear Energy Materials	$498,100
P/ANL2013-154	Atomic Layer Deposition System for Continuous, High Speed Thin Film Processing	$248,900
P/ANL2013-156	Fast High-Efficiency Process To Fabricate Aligned Nanotubes In Nano-Composite Membranes For High-Performance Filtration Applications	$397,900
P/ANL2013-165	Integrating Simulation and Observation: Discovery Engines for Big Data	$1,598,400
P/ANL2013-168	The Tao of Fusion: Pathways for Big-data Analysis of Energy Materials at Work	$388,600
P/ANL2013-171	Unconventional Signatures for Characterizing Culture Conditions	$150,200
P/ANL2013-173	Ratiometric Semiconductor Nanocrystal-Based Sensors for Threat Reduction Applications	$395,700
P/ANL2013-177	Identifying Novel Pathways for Anaerobic Microbial Oxidation of Methane	$203,600
P/ANL2013-178	Uranium and Plutonium Detection by Plasmonic Graphene-based Nano sensors	$99,500
P/ANL2013-184	Hierarchical Modeling of Self Assembly in Nanostructured Soft Materials at Equilibrium and Far from Equilibrium	$295,900
P/ANL2013-194	Annotating, Modeling, and Exploring Enzyme Promiscuity	$211,800

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
P/ANL2013-199	Multiresolution Adaptive Numerical Environment for Scientific Simulation for Materials	$99,000
P/ANL2013-202	Computational Molecular Science, to develop and apply an integrated suite of next-generation molecular science software	$218,700
P/ANL2013-206	Mathematical Techniques to Model Urban Data - to develop and test strategies to represent urban social/economic data such that a variety of mathematical methods and tools can be employed for data analysis and visualization	$304,800
P/ANL2013-208	General-Purpose Technical Cloud Platforms - to broaden the applicability of the Magellan platform beyond its initial scope of bioinformatics.	$156,500
P/ANL2013-212	Multiscale Materials Modeling using Accurate Ab Initio Approaches	$99,600
P/ANL2013-213	X-PECT: Performance Framework to Characterize and Transform Applications and Architectures at Extreme Scales	$154,100
P/ANL2013-216	Directed assembly and three-dimensional characterization of block copolymers in semi-thick films	$427,400
P/ANL2013-219	Transition Edge Sensors for Fundamental Physics	$937,400
P/ANL2014-004	Magnetic Separation of Rare Earth Elements	$125,400
P/ANL2014-018	Dynamics of Spin Ice - to investigate the localized dynamics caused by defects in spin ice systems and, ultimately, develop new approaches for their controlled manipulation	$185,800
P/ANL2014-019	Exploring the Universe with Full-Sky Simulations of the Cosmic Microwave Background	$145,100
P/ANL2014-023	Development of Large-Area Vacuum Ultraviolet Microchannel Plate Photodetectors for Use in Large Liquid Argon and Xenon Time Projection Chambers	$202,100
P/ANL2014-025	New Paradigms for High Temperature Superconductivity in Acene-based Materials	$201,600
P/ANL2014-046	Plastic Artificial Leaves for Water Splitting	$197,300
P/ANL2014-051	Carbon Nano-network as Next Generation Support for Catalysis and Electro catalysis	$175,700
P/ANL2014-054	Thin Film Skyrmion Spin Textures - the electric detection of individual moving magnetic skyrmions	$168,600
P/ANL2014-077	Directly Probing Nanoscale Dynamics in Shear Thickening Complex Fluids	$173,600
P/ANL2014-081	Pb-assisted Corrosion/Cracking Mechanisms at the Interface between Pb-containing Solution and Nickel Oxide Surface	$196,900
P/ANL2014-084	Probing the Chemistry of Atmospheric Dust Particles Using X-ray Spectromicroscopy: Implications for Climate Science	$181,700
P/ANL2014-095	Tuning the Transport Properties of Coupled Majorana	$235,700
P/ANL2014-108	Single Cell Structural Genomics of Uncultured Sediment Archaea. On the Trail for Novel Proteases	$196,500
P/ANL2014-120	Grid Level Energy Storage for Integration of Renewable Energy	$298,100
P/ANL2014-121	Integration of Scalable Microwave Reactor with High-Energy X-ray Beamline for High-Throughput Screening Energetic Nanomaterial Synthesis	$296,000
P/ANL2014-127	Development of a Novel Analyzer Systems for Resonant Inelastic X-ray Scattering with better than 10 mega electron volts resolution	$109,600
P/ANL2014-128	Length-scale Bridging Computational Scheme for Structure and Transport	$300,200
P/ANL2014-129	The Design and Synthesis of Novel Oxides: Coupling Materials Informatics with a Next-Generation Deposition System Employing In Situ X-Ray Scattering and Photoemission Spectroscopy	$293,300
P/ANL2014-132	Identifying Patterns and Association among Hyperspectral Data and Meteorological and Biological Measurements for Investigating Near-Surface Atmosphere-Biosphere Interactions	$149,000
P/ANL2014-133	In-situ X-ray Characterization of Doped Materials by Atomic Layer Deposition for Energy Applications	$311,200
P/ANL2014-134	Three Dimensional Coherent Diffraction Imaging Using Polychromatic Hard X-rays	$276,800
P/ANL2014-137	Yttrium Barium Copper Oxide High-Temperature Superconducting prototype undulator	$247,600
P/ANL2014-139	Fast Electronic Structure Methods for Rapid Reaction Screening for Inorganic Materials Synthesis and Particle Formation	$197,500
P/ANL2014-141	Minimizing Environmental Microbial Community Complexity at the Bench: Isolating and Characterizing Minimal Stable Communities Over Time	$409,700
P/ANL2014-145	Developing Remote Automated Sensors to Direct Sampling of Aerobic-Anaerobic Switching in Floodplain Ecosystems to Characterize the Response of Microbial Carbon Metabolism at High Temporal Resolution.	$324,100
P/ANL2014-151	Developing Predictive Models of Wide Bandgap Semiconductor Synthesis and Processing	$743,600
P/ANL2014-157	Biology at Speed: D-Factory, a Novel Experimental Framework	$291,400
P/ANL2014-160	Developing An Integrated Sensor Network for Science	$176,400

	United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015	
Project ID	**Project Name**	**FY Total**
P/ANL2014-161	Bridging the Electronic and Atomistic Scales: Force Field Development for Reactive Interfaces from First Principles	$393,800
P/ANL2014-163	Emerging Compute and Data Infrastructure - to assess current and next-generation components for use in data intensive applications, virtualized infrastructure, and service-oriented applications	$97,600
P/ANL2014-166	Scalable Stochastic Algorithms for Exascale Computational Mesoscience	$147,400
P/ANL2014-167	Improving and Validating Models of the Urban-Climate Connection with Dense Sensor Networks	$150,600
P/ANL2014-169	Magneto-Dielectric Composite Substrates Comprised of High Aspect-Ratio Magnetic Nanofibers for Smart Antennas Operating at Microwave Frequency	$249,300
P/ANL2014-174	Advanced Pipeline for High-throughput Digitization of Large-scale Collections	$99,900
P/ANL2014-175	Automation of In Situ Crystallization Plate Screening and Data Collection at Room Temperature	$207,900
P/ANL2014-177	Development of a Computational Fluid Dynamics Multiphase Boiling Capability to predict the Critical Heat Flux in Nuclear Reactor Fuel Assemblies	$410,400
P/ANL2014-181	PARIS - Data Knowledge-based Extreme-scale Resilience - to explore new localized detection and recovery techniques, new compression algorithms, and new approaches based on forward recovery	$546,900
P/ANL2014-182	Dynamic Data Mirroring for Data-intensive Science - an analogous approach can be used for scientific, big data, with mirroring serving to make data available on computer systems with different cost, performance, and capability characteristics	$144,700
P/ANL2014-183	Impact of Radiation and Surface Turbulent Fluxes on the Transition from Stratocumulus to Cumulus Cloud Regime	$88,300
P/ANL2014-184	Designing and fabricating several 1-m-long Superconducting Undulators Magnet	$94,000
P/ANL2014-185	Enabling Sodium-ion Batteries for Grid Storage	$140,500
P/ANL2014-187	Self-assembled Functional Membranes for Filtration and Photocatalytic Water Treatment	$126,500
P/ANL2014-188	Timescale of Groundwater Transport: A Prerequisite for Developing and Maintaining Groundwater Reservoirs	$76,400
P/ANL2014-189	Membrane-Biofilm Nexus: Advanced Membrane Autopsy as a Tool for Revealing Membrane Biofouling and Development of New Membranes Materials and Structures	$35,000
P/ANL2014-191	Defect-localized Spins in Semiconductors for Quantum Optoelectronics	$346,400
P/ANL2014-192	Computational Spectroscopy of Heterogeneous Interfaces	$333,900
P/ANL2014-193	Turbulent Transports in Cumulus Topped Boundary Layers	$290,700
P/ANL2014-194	Crime on the Urban Edge: Simulating the Interface between Transnational and Local Crime	$395,200
P/ANL2015-015	Detection of Dark Matter Directionality by means of Columnar Recombination	$236,800
P/ANL2015-078	Josephson Plasma Wave-Based Ultra-High Frequency Electronics	$180,900
P/ANL2015-091	Next Generation Natural Gas Adsorbent through Rational Design and Modeling	$195,900
P/ANL2015-096	Understanding Atomic Scale Uranium Interactions Under Severe Accident Conditions	$181,100
P/ANL2015-121	Development of Advanced VO2 Nano-Composite Thermochromic Materials for High Performance Smart Windows	$246,300
P/ANL2015-124	Incorporating Fungal and Bacterial Community Metabolisms to Improve Carbon Cycle Predictions of Earth System Models	$49,700
P/ANL2015-129	Economic and Technical Aspects of Nuclear Energy Competitiveness in the Current U.S. Deregulated Electricity Markets	$200,200
P/ANL2015-132	A Novel Reactor for the Continuous Manufacturing of Metal Oxide Particles	$200,300
P/ANL2015-135	Lab-wide Research to develop the core of an extensible analytics platform	$153,100
P/ANL2015-136	Nuclear Materials under Extreme Conditions	$305,400
P/ANL2015-139	Implementing a New Extreme-Scale Parallel Programming Model with a Full Sample Application	$258,900
P/ANL2015-141	Using Hard X-rays to Accelerate the Synthesis of Materials	$335,400
P/ANL2015-144	Framework for Integrating Multi-Modal Imaging of Materials for Energy Storage	$332,500
P/ANL2015-145	Understanding Embrittlement in Cast Austenitic Stainless Steels and Stainless Steel Welds	$207,900
P/ANL2015-147	Development of a Compact 352-MHz/150kW Continuous Wave Solid State Radio Frequency Power Amplifier System for Accelerators	$268,500
P/ANL2015-149	Integrated Imaging, Modeling, and Analysis of Ultrafast Energy Transport in Nanomaterials	$396,700

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
P/ANL2015-150	Unraveling Mesoscale Spatial-temporal Correlations in Materials Using Coherent X-ray Probes	$414,800
P/ANL2015-151	Chemical Vapor Processing for Additive Manufacturing	$253,100
P/ANL2015-152	In-situ Co-analysis of Atomic and Electronic Structural Evolution for Materials Synthesis	$50,100
P/ANL2015-153	The VelociProbe: Ultra-High-Resolution Ptychographic Hard X-ray Nano probe	$358,000
P/ANL2015-154	Integrated Imaging to Understand and Advance Photo catalysis	$334,200
P/ANL2015-157	Sustainable Transportation: Novel Bio-derived Fuel Additives for Improved Vehicle Efficiency	$297,900
P/ANL2015-159	Large-scale Modeling and Simulation for an Adaptive and Resilient Power Grid	$252,000
P/ANL2015-161	Ion Beam Figuring with In-situ Metrology: Diffraction Limited X-ray Optics and Dynamic Aperture for Three-Dimensional Control of Thin-Film Deposition and Ion-Beam Erosion	$173,000
P/ANL2015-164	Next-Generation Mossbauer Spectroscopy	$333,900
P/ANL2015-167	Coherent X-ray Studies of Materials Synthesis and Dynamics	$614,000
P/ANL2015-168	The Computational Design of New Functional Materials from Complex Transition Metal Oxides	$95,200
P/ANL2015-169	Agent-based Behavioral Modeling of Ebola Spread in Chicago and other Large Urban Areas	$400,400
P/ANL2015-170	Biomimetic Approaches for Water Smart Landscapes	$58,200
P/ANL2015-171	Genome Engineering of Environmental P. Fluorescens to Investigate Bacterial Interactions with Plant and Other Microbes	$259,400
P/ANL2015-172	Determining Mechanical Properties of Material Systems using Parameter-Free Metadynamics	$79,400
P/ANL2015-173	Isotope Geochemistry via Sn Isotope Fractionation using Inelastic X-Ray Scattering of Synchrotron Radiation	$32,200
P/ANL2015-174	Conversion of C2 and C3 Paraffins into Liquid-Phase Products	$277,200
P/ANL2015-175	Magnetic Phases in Highly Oxidized, Low-Dimensional Oxides	$36,400
P/ANL2015-176	Connected & Automated Vehicles will communicate with each other and with the infrastructure, and driver tasks will shift to automated controllers	$250,200
P/ANL2015-177	Integration of Multiple Infrastructure Dependencies and Interdependencies into Infrastructure Hazard Analysis	$238,700
P/ANL2015-179	Illuminating Linkages Between Microbial Diversity and Biogeochemical Cycling in a Redox Dynamic Environment	$130,400
P/ANL2015-180	Functional Analysis of Proteins from a Key Signaling Network Involved in Plant Growth Promoting Bacteria	$90,700
P/ANL2015-181	Fine Resolution Reconstruction of Large Volumes of Brain	$299,100
P/ANL2015-182	Developing New Schemes for Nuclear Resonant Scattering Measurements at and Upgraded APS	$33,500
P/ANL2015-183	Implementing New Microscopy Capabilities at the Advanced Photon Source	$44,700
P/ANL2015-184	Development of Novel X-ray Tools for Understanding Extreme-pressure Magnetism and Electronic Ordering at Fourth-generation Synchrotron Storage Rings	$41,700
P/ANL2015-185	Development of a Cryogenic Correlative Confocal Light Microscope for Integrated Imaging	$206,500
Total # of Projects for ANL: 125	**Total Cost for ANL:** $30,980,000	
Total Administrative Cost: $20,200		
BNL - Brookhaven National Lab		
12-012	Inter-Individual Variation in Radiation-Induced Epigenetic Modifications and their Potential Impact on Carcinogenesis	$99,595
12-015	Developing an Integrated Atmosphere-Ecosystem Model for Investigating Interactions Between Atmospheric System and Ecosystem under a Warming Climate	$161,597
12-018	Conical Slit for Probing Buried Micron or Sub-Micron Volumes for Dynamic Measurements of Heterogeneous Materials	$15,537
12-023	Femto-Second X-ray Pulse Generation by Electron Beam Slicing	$30,515
12-025	Flow-Based Battery Architectures for Large-Scale Electrical Energy Storage	$565,804
BNL12-007	Complex Modeling: Leveraging Advanced Scattering Data with Computation to Push Back the Materials Complexity Frontier	$426,247
BNL13-003	Testing High Energy Electron-ion Collider Beam-Beam Effects with Coherent electron Cooling Accelerator	$34,153
BNL13-005	Permanent magnet solution of the High Energy Electron-ion Collide with Nonscaling Fixed-Field Alternating Gradient	$83,391

Project ID	Project Name	FY Total
BNL13-006	Time resolved imaging of X-rays and charged particles	$281,861
BNL13-013	Electrochemical reduction of carbon dioxide on surface-modified metal electrodes	$132,573
BNL13-017	A National Synchrotron Light Source II Workflow Prototype System for Supporting Data Intensive Beamline Experiments	$413,313
BNL13-020	Synthetic Control of Lipid Biosynthesis in Plant Vegetative Tissue	$213,753
BNL13-022	Tracking Lithium Electrochemical Reaction in Individual Nanoparticles at National Synchrotron Light Source- II	$292,470
BNL13-024	Elucidating the Role of Nanostructured Domains in Copper Indium Gallium Diselenide Photovoltaic Device Performance	$279,025
BNL13-025	A Probabilistic Approach to Sizing Battery Energy Storage Systems for Improved Grid Inertial Response	$66,845
BNL13-027	In situ Studies of Interfaces Under Extreme Environments	$82,483
BNL13-031	Modulation Enhanced Diffraction: a new tool for powder diffraction and total scattering studies	$138,096
BNL13-032	Development of At Wavelength Metrology Tools	$269,995
BNL13-033	Multidimensional imaging data analysis: from images to science	$285,831
BNL13-034	Atomic resolution elemental mapping using X-ray assisted Scanning Tunneling Microscopy	$149,039
BNL13-038	Catalysis Program in Sustainable Fuels- investigate catalytic processes for incorporation of carbon dioxide into a fuel synthesis pathway for hydrocarbon fuels	$689,170
BNL14-003	Boron Arsenide Thin Films for Next-Generation Thermal Neutron Detectors	$249,536
BNL14-005	1st Light: Elucidating Solid-Solid Interfaces in Energy Storage Systems	$193,799
BNL14-011	High Performance Direct Winder Superconducting Magnets	$278,504
BNL14-021	In Situ Investigation of the Strain Distribution in Next-Generation 3-Dimensional Transistors Using X-Ray Nano diffraction	$177,474
BNL14-024	Enable Early Sciences in National Synchrotron Light Source II with Experiment-Driven Big Data Stream System	$765,477
BNL14-026	Increasing efficiency of nitrogen use by plants: a prerequisite for bioenergy crops on marginal lands	$469,793
BNL14-028	Tissue-specific metabolic models in plants	$327,923
BNL14-035	Operando studies of C1 catalytic reactions: Probing model and technical catalysts at high pressures using soft X-rays	$172,020
BNL14-036	Correlative microscopy, spectroscopy and diffraction with a micro-reactor	$80,871
BNL14-037	Imaging Electronic Texture in High-Temperature Superconductors	$194,329
BNL15-003	Bunch-by-Bunch Beam Position Monitor for High Energy Electron-ion Collide	$71,995
BNL15-005	Advanced Coherent Electron Cooling	$304,648
BNL15-006	Design, fabrication and test of a Superconducting Radio Frequency cavity prototype for High Energy Electron-ion Collide Energy Recovery Linac	$26,352
BNL15-009	Nano confined Polymer Electrolytes for Rechargeable Lithium-Metal Batteries	$105,167
BNL15-010	Hydrocarbon chemistry on zeolite model systems: towards a detailed understanding of energy-relevant chemical transformations	$137,149
BNL15-011	Revealing the structure and dynamics of discrete meso-architectures	$191,725
BNL15-020	A new frontier for improving processes for regional and global climate modeling	$145,068
BNL15-025	Growth of Self-activated scintillators for dual gamma and neutron detection	$161,177
BNL15-031	Inelastic X-Ray Scattering determination of the inter- and intra-particle dynamics of nanoparticle super lattices: key to the development of Terahertz phononic crystals	$80,739
BNL15-034	Searching and sorting haystacks - develop methods for dealing with the highly fragmented crystallographic data sets that will be generated at National Synchrotron Light Source II	$53,112
BNL15-037	Insitu microscopy investigation of complex manganese oxides for energy storage	$247,822
BNL15-038	Segmented Adaptive-Gap Undulator with Different Period Lengths in Segments for Production of High Flux and Brightness Hard X-rays at National Synchrotron Light Source II	$331,046
	Total # of Projects for BNL : 43 **Total Cost for BNL :** $9,477,019	
	Administrative Cost Paid by Laboratory Overhead	
FERMI - FERMI National Accelerator Lab		
FNAL-LDRD-2014-010	Cosmic Microwave Background Detector Development at Fermilab	$442,591
FNAL-LDRD-2014-012	Development of High Temperature Superconductors Based Rapid-Cycling Accelerator Magnets	$152,869
FNAL-LDRD-2014-016	High Frequency Gallium Nitride Driver	$187,365

Project ID	Project Name	FY Total
FNAL-LDRD-2014-025	The Sinuous Target - Generate a new, engineered material for use in high-power accelerator targets	$26,314
FNAL-LDRD-2014-027	From Magic to Method: Characterizing High Voltage in Liquid Argon Time Projection Chambers with the Breakdown in liquid argon cryostat for high voltage experiments	$400,349
FNAL-LDRD-2014-028	Deployment and operation of prototype charge-coupled device array at Reactor Site for detection of Coherent Neutrino-Nucleus Interaction	$111,363
FNAL-LDRD-2014-038	Application-Oriented Network Traffic Analysis based on Graphical Processing Units	$236,271
FNAL-LDRD-2015-009	High Energy Physics Pattern Recognition with an Automata Processor - Proof of concept demonstrating that an Automata Processor is suited to fast high energy physics pattern recognition applications	$158,929
FNAL-LDRD-2015-010	Dark Energy Survey and Gravitational Waves	$51,112
FNAL-LDRD-2015-020	Off-the-Shelf Data Acquisition System - Evaluate a low-cost, scalable data acquisition system architecture based on commercial technology	$264,640
FNAL-LDRD-2015-021	Transverse and Longitudinal Profile Diagnostics for H- Beams using Fiber Lasers and Synchronous Detection	$33,382
FNAL-LDRD-2015-029	Nb3Sn superconducting radio frequency cavities to reach gradients up to 90MV/m and enable 4.2K operation of accelerators	$124,828
	Total # of Projects for FERMI : 12 **Total Cost for FERMI :** $2,190,013	
	Administrative Cost Paid by Laboratory Overhead	
INL - Idaho National Lab		
I13-011	Integrated Approach to Algal Biofuel, Bio-power, and Agricultural Waste Management	$287,907
I13-013	Development a micro mechanistic phase-field modeling approach for life estimation and risk assessment of reactor pressure vessels	$172,014
I13-027	Diagnostics of advanced energy storage materials	$170,103
I13-029	In-Pile Detection of Crack Growth in the Advanced Test Reactor	$380,829
I13-032	Experimental and Computational Analysis of Hydride Microstructures in Zirconium in Dry Storage Conditions	$547,146
I13-033	Magnetic Separation Nanotechnology for Spent Nuclear Fuel Recycle	$209,697
I13-035	Development of New Molten Salt Sensor Technology for Application to Safeguarding Pyro processing	$86,838
I13-039	Induction Based Fluidics Mass Spectrometry for Characterizing Radioactive Extraction Solvents	$130,493
I13-050	Concurrent atomistic to macroscale modeling of materials under irradiation using the phase field crystal model	$311,046
I13-060	Metal Fluoride Preparation for Accelerator Mass Spectrometry Analysis	$146,159
I13-065	Multi-domain Modeling, Simulation, and Integration Tools for the Dynamic Analysis and Optimization of Hybrid Energy Systems	$325,972
I13-068	Cooling in Fractured Geothermal Reservoirs: Analyses of long-term cooling in typical geothermal reservoirs and application to geothermal resource potential assessments	$182,127
I13-071	Advanced Fracture Modeling for Nuclear Fuel	$252,937
I13-079	Diverse Biological Factories for Sustainable Manufacturing	$240,987
I13-092	Fission Product Standard Production	$81,720
I13-093	Spectrum Allocation and Communications in Dynamic Spectrum Access Channels	$249,966
I13-095	Development and Validation of a Societal-Risk Goal for Nuclear Power Plant Safety	$193,291
I13-097	Multiphysics Object Oriented Simulation Environment Capability Extension In Support of Full Core Modeling	$307,802
I13-105	Micro/Nano Scale Atomic Force Microscopy -based Thermal Conductivity Measurement and Atomistic Modeling for Oxide Fuel: the effects of grain boundary, fission gas and radiation damage	$138,158
I13-106	Building Organic-Inorganic Hybrid Materials To Protect Metal ION Sequestering Agents From Radiation-Induced Oxidative Damage	$222,966
I13-110	Nuclear-Renewables-Oil Shale Hybrid Energy System	$40,771
I13-115	Multi-scale full core reactor physics simulation	$512,313
I13-118	Geomagnetic Disturbance Field Coupling Measurement	$86,275
I13-121	Advanced In-Situ Measurement Techniques in the Transient Reactor Test Facility	$285,883
I14-009	Development of a Capability for High Temperature Flow, Heat Transfer, and Thermal Energy Storage with Multiple Applications	$610,456
I14-010	Use of Linear Variable Differential Transformer-Based Methods to Detect Real-Time Geometry Changes during Irradiation Testing	$307,731
I14-025	Minor Actinide and Lanthanide Separations in Alternative Media	$395,020

	United States Department of Energy	
	Laboratory, Plant or Site Directed Research and Development Report	
	Project List -- Fiscal Year 2015	
Project ID	**Project Name**	**FY Total**
I14-026	Multiscale modeling on delayed hydride cracking in zirconium: hydrogen transport and hydride nucleation	$194,297
I14-031	Multidimensional Multiphysics Modeling of Fuel Behavior During Accident Conditions	$375,458
I14-032	Controller Area Network Bus Security Across Multi-Sector Platforms	$296,813
I14-035	Safer Energetic Materials - Ignition Prevention with Improper Heating Rate	$21,708
I14-036	Innovative Research for Fieldable Nuclear Measurements	$69,102
I14-037	Development of Advanced Nuclear Material Characterization Technology for Security Applications	$73,697
I14-038	Multivariate Calibration of Complex Simulation Codes Using Disparate Types of Evidence	$293,087
I14-041	Uranium Nitride - Uranium Silicide composite ceramic fuel production via Spark Plasma Sintering	$188,156
I14-045	End-to-End Radiation Detector Enhancements for Improved Safety and Security in Safeguarded Facilities	$44,589
I14-075	Development of tools and methodologies for uncertainty quantification and validation for multi physics fuel performance simulation	$286,451
I14-078	Extended Stability Gamma-Gamma Prime Containing Nickel-Base Alloys	$398,969
I14-079	Second Generation Switchable Polarity Solvent Draw Solutes for Forward Osmosis	$324,049
I14-080	Battery Material Characterization Technologies	$38,814
I14-086	Development of a Micro grid/Smart grid Testbed for the Energy Systems Laboratory and Super Lab Initiative with Load variability characterization and control for renewable energy integration	$396,898
I14-087	Transparent Fiber Reinforcements for Transparent Protection Systems	$44,210
I14-091	Battery health estimation based on self-discharge fast measurement and soft short-circuit detection.	$175,470
I14-093	All Hazards Critical Infrastructure Knowledge Framework-methods for assessing infrastructure vulnerabilities and risks for all-hazards	$240,887
I14-094	Specific Manufacturing Capability Advanced Armor Materials and Systems Research & Development	$182,959
I14-095	In Situ Measurement of Electrolyte Chemistry in Battery Cells During Operation	$100,554
I14-098	Irradiation Effects of Uranium Dioxide	$456,860
I14-104	Development of a Multiphysics Algorithm for Analyzing the Integrity of Nuclear Reactor Containment Vessels Subjected to Extreme Thermal and Overpressure-Loading Conditions	$351,554
I14-106	Understanding the Growth of Ultra-long Carbon Nanotubes	$232,978
I15-002	Experimental Scenarios of Adversity and Recovery in Aqueous Separations.	$426,385
I15-013	Simulation Based Analysis of Procedures and Accident Management Guidelines-to improve the state of the art of Probabilistic Risk Analysis	$204,892
I15-014	135 Cesium Quantification: A 135 Xenon Proxy	$105,452
I15-023	Development of Stochastic Three Dimensional Soil Response Capability in the Multiphysics Object Oriented Simulation Environment to Provide Design and Beyond Design Basis Seismic Motions	$59,861
I15-032	Development of new method for high temperature thermal conductivity measurements of nuclear materials	$249,914
I15-036	Resilience Metrics Design Establishing the Resilience Benefit of Smart Grid Advancements	$63,542
I15-039	Transient Modeling of Integrated Nuclear Energy Systems with Thermal Energy Storage and Component Aging and Preliminary Model Validation via Experiment	$632,424
I15-040	Acoustic telemetry infrastructure for in-pile Advanced Test Reactor and Transient Reactor Test Facility	$289,243
I15-060	Development of Efficient Transient Reactor Test Facility Modeling Capabilities with Graphite Data Improvement	$441,732
I15-071	Determination of used fuel burn-up through fluorimetry of activation products.	$77,586
I15-082	Advanced Fission Chain and Multiplicity Analytics	$78,240
I15-083	Visualization of Highly Dense Geospatial Data	$93,626
I15-086	Grid Data Analytics Framework-collect operational and experimental data with the appropriate pedigree for sharing, use options and experiment/operational conditions will enable grid analytics	$89,289
I15-094	Evaluation and Demonstration of the Integration of Safeguards, Safety, and Security by Design	$93,503

Project ID	Project Name	FY Total
I15-096	End-to-End Dynamic Program Analysis for Industrial Control Systems with Concolic Execution	$207,130
I15-097	Security Risks Posed by Convergent Evolution in Industrial Control Systems Internals	$26,913
I15-098	Developing and Demonstrating Cost-Effective Ballistic Protection for Critical Electrical Assets	$130,494
I15-100	Real time Process Simulator-enable current and future research efforts to produce more holistic and innovative cyber security solutions	$274,692
I15-106	Automated Security Vulnerability Analyzer for Long Term Evolution Systems - LTE Hack Box	$256,136
I15-107	Advanced Visualization for Simulation and Modeling-ideal for modeling radiation detection systems	$69,718
I15-111	Adversary Signature Development and Threat Analysis-develop new technical indicators of human intent	$124,226
I15-125	Phosphoranimines for advanced battery applications	$272,510
I15-128	Microstructural evolution and mesoscale coupled flow-reaction-fracturing processes in organic rich nanoporous shales	$257,401
I15-135	Dynamic Simulations for Large Scale Electric Power Networks in Real Time Environment using Multiple Real Time Digital Power System Simulators	$270,672
I15-140	Expanding the Utility of Advanced Chemical Physics Models for Electrolytes	$171,315
I15-141	Interfacing Multiphysics Object Oriented Simulation Environment Components to Enhance Capability	$88,790
I15-142	New in core neutron diagnostics-develop and characterize a new technology for neutron dosimetry	$64,069
I15-143	Development of Bayesian Uncertainty Quantification Tools for Use In Complex Modeling and Simulation Code Validation	$82,878
I15-144	Investigation of Sonication Assisted Electrolytic Reduction of Used Oxide Fuel in Molten Salt	$118,911
I15-145	Advanced Neutron and X-Ray Imaging at the Transient Reactor Test Facility	$83,759
I15-146	Tailoring the Kinetic Function of a Surface through Electronic Effects of Nanoscale Architecture	$638,099
I15-147	Rare Earth Element Catalysts for Carbon Based Chemicals	$73,757
	Total # of Projects for INL: 81 **Total Cost for INL:** $17,781,326	
	Total Administrative Cost: $446,426	
KCP - Kansas City Plant		
24642	Advanced Glass-Ceramic Headers Equipment for New Header Manufacturing Techniques	$14,528
24652	Myers Small Batch Dispenser for Synthesis of Custom Silicone Materials	$48,454
24680	Direct Write Thick Film Circuit Equipment for Antenna Technologies	$451,640
24694	Additive Manufacturing Metal Qualification Equipment to Support Ti and Al Substrates	$17,807
24700	Additive Manufacturing Metal Surface Finish Equipment for Measuring Surface Characteristics	$93,536
24701	Infrared Vision: Component Circuit Board Inspection Equipment - Digital Light Processing Technology	$17,049
24711	Selective Laser Melting Aluminum Development Equipment - Development of Steel for Tooling	$26,521
24747	Refractive Index Detector	$19,086
24750	High Temperature Thermal Analysis Equipment - In-situ Thermo-Physical Analysis	$205,183
24772	Fourier Transform Infrared Spectrometer	$28,748
24796	Keyence Systems	$53,719
24797	Profilometer to Measure Deposited Thin Films	$20,031
24798	Plant Directed Research & Development Project Microscope	$25,768
24801	Vibration Channels for an Environmental Test Fixture for Shock Response Testing	$48,066
24802	Shock Channels for an Environmental Test Fixture for Shock Response Testing	$19,512
24803	MLab Additive Manufacturing Machine for Miniature Builds	$286,777
24804	Laser Doppler Vibrometer for Measuring Vibration and Velocity	$105,849
24826	Additive Manufacturing Metallography Analysis Equipment	$46,792
24827	Thick Physical Vapor Deposition Films Current Viewing Resistor	$147,212
24840	High Speed Camera for Real-Time Data Acquisition	$55,238
703566	Plant Directed Research & Development Program Management Account	$398,701
704330	Gas Transfer System Laser and Deep Tungsten Inert Gas - utilizes additions within the weld wire during gas tungsten arc welding	$74,203

	United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
704343	Microfluidics and Capsules - to create materials that would be too difficult or impossible to produce due to their size and difficult to control reactions	$245,393
704348	Acceleration Characterization Utilizing a Pulse Forming Network	$3,452
704352	Additive Manufacturing - Metals - Development of custom materials	$27,886
704362	Common Tester Architecture Technology - explore an alternative approach to utilizing a web-based application and database	$62,583
704363	Multi-chip Module Complex Material Analysis to Predit Aging Characteristics	$815
704375	Safety Project Maturation	$13,772
704379	Advanced Glass-Ceramic Headers for Increased Mechanical and Thermal Robustness	$1,521
704439	Test Equipment Additive Manufacturing - making interface hardware that is adaptive and inexpensive	$28,898
704444	Integrated Telemetry Module Transmitter as Alternatives to Commercial Off the Shelf Transmitters	$4,412
704445	Alternate Conductor Patterning - Optimization of Laser Ablation	$836
704453	National Secure Manufacturing Plant Directed Research & Development FY14 Proposal Program Management Account - residual from FY14	$212
704458	Process Effects on Product Operating Parameters - to increase understanding of the applicability of multimedia principles for procedural instructions	$41,773
704460	Direct Write Thick Film Circuit for reducing the cost and duration of development schedules through the investment of direct digital manufacturing	$66,706
704464	Multi-Machine Qualification- seeks to improve the method in which products are qualified	$163,737
704472	Optical Trigger Source Develop - the packaging of a laser has an effect on its performance and reliability	$271,112
704476	Composite Structures - to develop the processes for fabricating structural composite coupons and parts	$170,817
704486	Printed Circuit Board Physical Unclonable Function - to improve product security and confidence	$75,389
704492	Through Substrate Via Plant Directed Research & Development - to fabricate a through-silicon via on a new application specific integrated circuit	$242,551
704493	Application Specific Integrated Circuit Trusted/Counterfeit Test - to develop Laser Terahertz Emission Microscopy	$357,663
704498	Advance Radar Target Simulator to Increase Tester Quality and Accuracy	$1,276
704499	Pre-Oxide/Glass-Ceramic Sealing - to investigate what effect temperature, time, environment and oxide thickness have on glass-ceramic seals	$291,860
704502	Expert Feature Extraction from Digital X-ray Images	$183,896
704507	Testing Inorganic Starting Material to support quality control and development efforts	$263,388
704520	Analysis of Material Properties and Product Efficiency for Part Qualification	$4,139
704523	Characterization of Bulk Parameters for a Selective Laser Melting Platform	$26,606
704524	Shock & Vibration Dynamics - to implement experimental tools to develop validation metrics for numerical models	$71,160
704529	Silicone Nanocomposites for Advanced Materials Development for Specific Thermal and Mechanical Properties	$233,512
704532	Metal Forming/Processing - to develop tools and processes to better predict behavior of metal	$54,453
704533	Physics/Model Based Assembly Model - virtually testing new designs and processes for assembly modeling	$138,810
704536	Electron Beam Melting Parameter Establishment for New Materials	$30,163
704537	Additive Manufacturing Part Testing	$743
704547	Photochromic Radiation Sensing	$13,614
704552	Electrostatic Data Acquisition and Real Time on Beam for Digitizing and Collecting Data	$1,369
704553	Additive Manufacturing - Metals - develop a simulation system to evaluate part warpage before machine execution	$168,736
704558	Multi-Dimensional Analysis of Tester and Calibration Data for Enhanced Tester Health and Preemptive Response	$76,104
704564	Silicone Supply Security - to develop in-house expertise and a climate of silicone materials experts	$390,675
704569	Silicone Polymer Scale Down Capability - how processing parameters effect silicone products though small scale studies	$176,097
704580	Submersible Propulsion for High Durability and Reliability	$99,272

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
704586	Gun Shot Detection System Utilizing Wireless Mesh Networks	$180,683
704587	University Senior Design Projects to Support Plant Directed Research and Development	$127,964
704588	Systems Engineering for Technical Communications, Threat Detection and Environmental Sensing	$3,152
704589	Center of Excellence Technology & Roadmap Planning	$3,075,300
704590	Plant Directed Research & Development Test Cell for Eddy Current Displacement, Measurement Accuracy and Multi-Physics Systems	$292,603
704592	FY14 Kirtland Operations Quick Response Program Management	$343
704595	Unleashing Creativity - Challenges in Antenna, Magnetic Field Switching and Mechanical Actuator Technologies	$3,997
704596	Variable Focal-Length Lenses with Instantaneous, Direct-View Variable Magnification	$132,927
704599	Lead-Free Material for Lightening Arrestor Connector Functionality - to evaluate potential synthesis and characterization techniques of non-lead based materials	$103,872
704603	Shape Optimization - evaluate global shape optimization techniques to enhance the Forging Advisor simulation tool	$60,343
704604	Model Based Enterprise Development helps innovate new product introduction, product realization velocity and product quality	$26,255
704608	High Temperature Thermal Analysis - to develop high temperature thermal analysis capability	$30,962
704609	Advancement of Welding Simulation to include Fluid Effects	$72,811
704610	Gamma Ray Imaging - investigate efficient gamma ray imaging designs optimized for imaging sources at short ranges	$310,242
704611	Composite Modeling of Cell Structure - investigate the adaptation of additive metal manufacturing techniques in producing cellular metal structures	$66,801
704614	Thick Physical Vapor Deposition Films for Current Viewing Resistor and Force Sensor	$148,539
704615	Powder Coating of Low Temperature Non-conductive Materials	$27,637
704616	Alternative Surety Technology 1 - Evaluating the use of an alternative technology.	$108,402
704617	Alternative Security Technology 2 - Evaluating the use of an alternative technology.	$124,427
704618	Additive Manufacturing Surety Technology 3 - Evaluating the use of an alternative technology.	$343,432
704619	Selective Laser Melting Material Feasibility Studies & Development	$209,735
704620	Selective Laser Melting Aluminum Development and Powder Safety Hazards	$193,189
704621	Additive Manufacturing Metal Surface Finish for Part Property Modification	$90,545
704624	Plant Directed Research & Development Virtual Machine Tester - to investigate the most optimum method to add test software's to an existing tester	$9,674
704627	Zero Power Sensors that are passive but become active when exposed to particular stimulants	$80,191
704628	Development of 3D Scanning Processes Utilizing Non-Contact Techniques	$208,513
704629	Investigate New Optical Inspection Methods	$109,164
704633	Additive Manufacturing of Spin Test Tooling - with titanium and stainless steels could enable unique spin test tool approaches	$322,868
704634	Application Specific Direct Write and Electrophoretic Deposition Techniques - evaluate the application of aerosol jet, ink filament writing for microelectronic assembly	$115,261
704636	Additive Manufacturing: Speed Function Optimization for Arcam Electron Beam Melting	$267,717
704637	Titanium Hermetic Materials - rigorous materials selection evaluation to assess potential insulator compositions and titanium base alloys for hermetic applications	$15,657
704639	Selective Laser Melting Electron Beam Melting Characterization	$118,696
704640	Selective Laser Melting Electron Beam Melting Geometry	$125,263
704643	Miniature Microwave Circuit	$79,396
704644	Combined Environment Test Platform capable of single-axis high onset rotational acceleration, vibration and temperature testing	$268,779
704646	Intra-Tester Wireless Development for Transmission of Data	$57,934
704648	Zero Trust Network Development for Encryption	$97,871
704651	Non-Contact Measurement for In-Situ Verification during Fabrication or Final Inspection	$279,148
704652	Gas Transfer System Laser in Vacuum	$75,903
704653	Near Field Communication for Manufacturing	$262,965
704654	Optimization of Digital Radio Frequency Memory Technology in order to optimize performance of applications	$107,310

Project ID	Project Name	FY Total
704656	De-embedding Radio Frequency Adapters in Measurements to research calibration methods	$6,145
704660	Ultraviolet Photodiode Fabricated Using Graphene and Zinc Oxide Nanowires	$220,023
704661	Low Frequency Magnetic Sensors via Novel Magnetic Thin Films for Magnetic Sensitivity	$232,474
704662	Molecular Modeling of Polymers Utilizing Applications of Molecular Dynamics, Quantum Mechanics and Dissipative Particle Dynamics.	$220,480
704663	Noncontact Vibration Velocity Using Doppler Shift Technologies	$64,642
704664	Helical Electromagnetic Launcher Research Integration for Calibration of Accelerometers	$150,728
704665	Additive Manufacturing Metal Qualification of Titanium and Aluminum	$431,647
704666	Automated Battery Tester for Simultaneous Measurement and Data Formatting	$66,889
704667	3D Printing Metallic Connectors & Backshells - to investigate additive manufacture printing	$181,116
704669	Rapid Software Defined Radio Development & Deployment	$93,319
704670	Thermal Acoustic Generator - to use the traveling sound wave generator to drive piezo devices and create an electrical power source	$212,822
704671	Additive Manufacturing Carbon Nanotube Reinforced Metal Matrix Composites	$207,358
704672	Infrared Vision: Component & Circuit Board Inspection - to greatly reduce rework costs and improve quality	$84,150
704674	Safety Project Maturation - to investigate the possibility of manufacturing assemblies using additive manufacturing techniques	$331,392
704676	Additive Manufacture of Stronglinks: Proof of Concept - to investigate the use of additive manufacturing to build micro-mechanical products	$108,050
704679	Secure Independent Validation	$248,553
704680	Orbital Situational Awareness - Development of an embedded system that can provide enhanced satellite coverage	$132,220
704682	Statistical Analysis - Detection and Prevention of Product and Technology Non-Conformance	$98,075
704684	Special Tooling for New Spin Former - To accommodate potential new applications.	$82,588
704685	Plant Directed Research & Development Lead Engineering Account Manager Account	$44,163
704686	Quick Response Project for Early Readiness Level Feasibility Studies	$329,944
704687	Doppler Radar Sensor Using Ruggedized Sensor Packages	$66,944
704688	Future Manufacturing Process Models Utilizing Finite Elemental Analysis	$54,994
704689	Deposition and Testing of Thin, Metallic and Non-Metallic Coatings on 3D Parts	$63,477
704690	Adjustable Linear Test Sled for Vertical and Horizontal Robust Testing	$174,914
704691	Quick Configurable Secure Wire System Using Wireless Sensor Technologies	$247,739
704692	Intelligent Materials Using Photonic Materials on Various Substrates	$104,555
704693	Microelectronic Packaging/Packaging Technology Improvements to Solder Joints in an Upper Stacked Configuration	$113,032
704695	Plant Directed Research & Development Massachusetts Institute of Technology Project	$1,040
704696	Polymer Additive Manufacturing - Improving Polymer Interlayer Performance	$41,096
704697	Packaging and Radio Frequency for the Future Electrical Systems	$42,495
704700	Firmware Validation as a Reverse Engineering Tool	$21,769
704709	Fatigue Studies of Additively Manufactured Parts	$10,610
704717	Characterization and Testing of Carbon Fiber From Asphaltenes	$10,349
704725	Evaluation of Disturbances to Power Lines via Monitoring Techniques	$139,727
704743	The Effects of Machine Parameter on Part Properties and Characteristics	$30,805
704744	Investigate Perimeter Technologies via Video Analytics - Sight Logix	$39,466
Total # of Projects for KCP: 138 **Total Cost for KCP:** $19,256,082		
Administrative Cost Paid by Laboratory Overhead		

LANL - Los Alamos National Lab

Project ID	Project Name	FY Total
LANL-20120750PRD2	Chemically Modifying the Uranyl Ion	$118,542
LANL-20120751PRD2	Frustrated Materials-devoted to understanding novel properties of frustrated magnets	$142,558
LANL-20120753PRD2	Designing and Probing Novel Materials by Pressure Tuning of Nanocrystals	$120,849
LANL-20120768PRD3	3D Turbulent Magnetic Reconnection Experiments and Simulations	$7,471
LANL-20120776PRD4	Catalytic Mechanism and Inhibition of Metallo-beta-lactamases, the Ultimate Threat Against Antibiotics.	$74,871
LANL-20130003DR	Using Micro reactors for Efficient Plutonium Separations	$1,566,597

Project ID	Project Name	FY Total
LANL-20130005DR	Disruptive Innovation in Numerical Hydrodynamics	$1,187,483
LANL-20130013DR	Empowering the Expert: Machine Learning with User Intelligence	$1,511,205
LANL-20130019DR	Illuminating the Origin of the Nucleon Spin	$1,759,320
LANL-20130026DR	Fighting Carbon with Carbon: All-Carbon Nanomaterial Photovoltaics	$1,510,031
LANL-20130030DR	Peta-scale Studies of Cosmic Explosions and Supernova Shock Breakout with Palomar Transient Factory	$1,468,069
LANL-20130052DR	Design Principles for Materials with Magnetic Functionality	$1,408,920
LANL-20130058DR	High Performance Atom-Based Sensors for Fields and Rotations	$1,574,123
LANL-20130065DR	Non-Precious Metal Electro catalysts for Clean Energy	$1,483,680
LANL-20130091DR	Maximizing Flux through Engineered Metabolic Pathways	$1,567,663
LANL-20130118DR	Phase Stability of Multi-Component Nanocomposites under Irradiation	$1,456,845
LANL-20130121DR	Battlefield Magnetic Imaging Resonance Machine	$1,473,882
LANL-20130232ER	3-Dimensional Characterization of Nuclear Fuels: Microstructural Evolution under Representative Temperature and Thermal Gradients	$234,352
LANL-20130239ER	Label-Free Measurement of Single Cells by Impedance Cytometry in a Microfluidic Device	$326,080
LANL-20130244ER	A Computationally Efficient Model for Warm Dense Mixtures	$296,931
LANL-20130252ER	Software/Hardware Mapping for Data Locality Optimization	$278,328
LANL-20130265ER	Contextual Learning and Recognition-to develop machine learning methods for context aware probabilistic recognition of complex events and objects.	$321,312
LANL-20130285ER	Very Low Temperature Scanning Point Contact Spectroscopy Investigation of Inhomogeneous States on the Nano-scale.	$310,633
LANL-20130297ER	A New Hypothesis to Explain the Variability of the Outer Radiation Belt: Can we Predict Post-storm Fluxes of Energetic Electrons Based only on Pre-storm Fluxes of the Lower-energy Population?	$323,962
LANL-20130309ER	Excited State Quantum Interactions in Carbon Nanotubes	$332,504
LANL-20130319ER	Multidisciplinary Studies of Long Non-coding ribonucleic acids: towards a Structural Basis for ribonucleic acid in Epigenetics	$349,286
LANL-20130334ER	A New Approach to Multiscale Plasma Physics Simulations	$330,451
LANL-20130348ER	Enhancing Thermoelectric Properties of Topological Insulators through Nano structuring	$304,070
LANL-20130350ER	"Upscaling" Nanoscale Thermoelectrics: The Meso-macroscale Design Challenge for Real-World Energy Needs	$307,780
LANL-20130385ER	Giving Cold Atoms Weight: creating Heavy Fermions in Optical Lattices	$315,933
LANL-20130409ER	Topology in Superposition: Quantum Decoherence in Many-body Systems	$377,459
LANL-20130442ER	How Trees Die: Multi-scale Studies of Carbon Starvation and Hydraulic Failure during Drought	$335,367
LANL-20130463ER	Ultra-Bright Electron Beam Acceleration in Dielectric Wake Accelerators	$323,989
LANL-20130487ER	Pyro cumulus Collapse: Unpredicted Wildfire Dangers	$317,017
LANL-20130517ER	Accurate Interfacial Structures for Atomistic Simulations: Minimizing the Grand-Canonical Free Energy	$307,502
LANL-20130525ER	Understanding and Controlling Magneto-Electric Coupling in Multiferroic Materials	$322,453
LANL-20130558ER	Sparse, Distributed, and Robust Network Control-design decentralized controllers for power grid systems	$265,409
LANL-20130564ER	Wide Field-of-View Plasma Spectrometer	$294,448
LANL-20130590ER	Biocatalysts for Remediation of Uranium Wastes	$321,443
LANL-20130601ER	Phase Transitions at Extremes: Emergence of Topological Defects	$320,785
LANL-20130620ER	Structure Determination of Large and Membrane-Bound Proteins by Nuclear Magnetic Resonance Spectroscopy	$322,417
LANL-20130624ER	Magnetic Nano marker Detection and Imaging with Superconducting Quantum Interference Devices	$310,638
LANL-20130626ER	Beyond the Standard Halo-to understand in exquisite detail the distribution of dark matter within galaxy halos	$265,095
LANL-20130632ER	Coherent Diffractive Imaging of Ultrafast Ejecta Processes	$351,203
LANL-20130637ER	In Search of Light Weakly Interacting Massive Particles	$235,947
LANL-20130672ER	Redox active Catalysts for C-C Coupling Reactions Relevant to Renewable Energy	$380,567
LANL-20130679ER	Electron Capture Spectroscopy for Neutrino Mass: Isotopes, Science, and Technology Development	$355,356
LANL-20130681ER	Novel Chemical Architectures for Supercapacitor Electrolytes: Comparing In Situ Scattering Measurements to Theory and Simulation	$318,736
LANL-20130688ER	Emittance-Reduction System for Future Accelerator Solutions	$35,705

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
LANL-20130727DR	Quantum Chemistry, Information, Materials and Metrology	$535,047
LANL-20130728DR	Non-Equilibrium Phenomena in Materials, Fluids, and Climate	$771,599
LANL-20130733ECR	The World's First Drought and Insect Caused Global Tree Mortality Monitoring System	$67,006
LANL-20130737ECR	From Troposphere to Ionosphere: How Much do Thunderstorms Disturb the Total Electron Distribution?	$101,513
LANL-20130738ECR	Room Temperature Oxidation and Corrosion of Plutonium	$47,521
LANL-20130741ECR	Quantum Methods for Fast Signal Processing and Metrology	$190,388
LANL-20130744ECR	First Principle Study of Relativistic Beam and Plasma Physics Enabled by Enhanced Particle-In-Cell Capability	$148,032
LANL-20130745ECR	Novel Mesoscale Modeling Approach for Investigating Energetically Driven Nanoscale Defect/Interface Interactions	$48,478
LANL-20130749ECR	Stochastic Modeling of Phase Transitions in Strongly Interacting Quantum Systems	$49,284
LANL-20130755ECR	Magnetic Field Effects on Convection-Modified Solid-Liquid Interfaces	$54,522
LANL-20130757ECR	Understanding The Catalytic Conversion of Oligosaccharides to Fuels and Chemical Feedstocks.	$53,270
LANL-20130758ECR	Answer to Heavy Element Production Puzzle by Measuring Neutron-induced Charged Particles at Los Alamos Neutron Science Center	$50,395
LANL-20130764ECR	Effects of Joining Processes on Bimetal Interface Content and Radiation Damage Resistance	$48,824
LANL-20130772ECR	Probing Interface Reactions of Calcite Nanocrystals at Elevated Temperatures and Pressures	$9,292
LANL-20130778PRD1	Stimuli Responsive, Functional Biopolymers: Quinic Acid-Based Polymers and Their Assemblies	$29,513
LANL-20130779PRD1	Single Cell Genomics for Better Control of Plant Pathogens	$102,000
LANL-20130780PRD1	Nuclear Magnetic Resonance Study of Quantum States of Matter	$102,261
LANL-20130781PRD1	Electronic and Photonic Transport in Chiral Materials and Nanostructures	$106,981
LANL-20130783PRD2	Theoretical investigation of nucleon and nuclear structure at very high energies	$192,801
LANL-20130784PRD2	A Quadrature Approach for Non-Gaussian Uncertainty Representation and Propagation	$3,197
LANL-20130785PRD2	Efficient Carbon Nanotube Growth on Graphene-Metal Surfaces	$170,553
LANL-20130787PRD2	Hybrid Nanostructures for Photo reduction of CO2 to Hydrocarbons	$66,990
LANL-20130788PRD2	Alternating Positive-Negative Charge Systems: New Compounds and Synthetic Routes	$55,810
LANL-20130790PRD2	Graphene Quantum Dots for Carrier-Multiplication-Enhanced Solar Cells	$161,584
LANL-20130792PRD2	Mixing and Diffusion in Granular Flows towards understanding the complexity of granular materials	$206,088
LANL-20130794PRD2	Boosting New Physics Discoveries with Jet Substructure	$147,917
LANL-20130796PRD2	Microstructured Bio hybrid Synthesis of Photosynthetic Assemblies	$91,308
LANL-20130805PRD3	Topological Insulators-the development of new experimental techniques needed to test the theoretical prediction of a topological Kondo insulator state	$134,008
LANL-20130807PRD3	Joint Inversions of Seismic and Gravity Data in Volcanic Areas to Advance Hazards Assessment: A Focus on the Alaskan Subduction Zone and Kilauea, Hawaii	$142,598
LANL-20130808PRD3	Probing and Modifying Intertube Interactions in Semiconducting Carbon Nanotubes	$136,746
LANL-20130812PRD3	Understanding and Controlling Magnetism in Multiferroics with THz Pulses	$97,432
LANL-20130813PRD4	Broken Symmetries in Superconductors	$81,110
LANL-20130814PRD4	Ultrafast Vacuum Ultraviolet Spectroscopy of Complex Materials	$145,424
LANL-20130815PRD4	Discovery of Novel Bioactive Natural Products	$109,593
LANL-20130816PRD4	Hybrid Metal-Semiconductor Nanostructures for Optimized Photosynthetic Algal Growth	$94,120
LANL-20130817PRD4	From Food to Fuel: Making Ammonia Synthesis Viable for Energy Storage Applications	$82,729
LANL-20140000PRD4	Bayesian Information Gap Decision Analysis	$117,028
LANL-20140002DR	Discovery Science of Hydraulic Fracturing: Innovative Working Fluids and Their Interactions with Rocks, Fractures, and High Value Hydro-carbons	$1,530,760
LANL-20140005DR	Photoactive Energetic Materials for Quantum Optical Initiation	$1,571,653
LANL-20140011DR	Optical and Laser Spectroscopy of Th-229 Electronic and Nuclear Transitions for the Development of Solid State Nuclear Quantum Sensors	$1,449,698
LANL-20140013DR	Information-Driven Materials Discovery and Design-exercising a novel design loop that uses information science based tools	$1,625,773
LANL-20140015DR	Probing New Sources of Time-Reversal Violation with Neutron Electric Discharge Machining	$1,805,900
LANL-20140025DR	Multiferroic Response Engineering in Mesoscale Oxide Structures	$1,625,235

Project ID	Project Name	FY Total
LANL-20140029DR	First Direct Measurement of High-Z/Low-Z Plasma Interface Evolution in Isochorically Heated Dense Plasma	$1,845,255
LANL-20140033DR	Remote Raman-LIBS Spectroscopy Signature Integration	$1,645,535
LANL-20140046DR	The Role of Short-lived Actinide Isomers in High Fluence Environments	$1,647,804
LANL-20140049DR	Explosives signatures for detection: Nonlinear GHz to THz responses	$1,181,858
LANL-20140051DR	Exploring Mechanisms of Catalysis on Plutonium Surfaces	$1,670,820
LANL-20140074DR	Next Generation Quantum Molecular Dynamics	$1,538,213
LANL-20140114DR	Mesoscale Materials Science of Ductile Damage in 4 Dimensions: Towards the Computational Design of Damage-Tolerant Materials	$1,505,755
LANL-20140121DR	Combating Antibiotic Resistance: Targeting Efflux Pump Systems at Multiple Scales	$1,656,518
LANL-20140143ER	Micro-Mirror Full-Frame Programmable Spectral Filters for the Long-wave Infrared	$334,144
LANL-20140177ER	Spin-state Transitions as a Route to Multifunctionality	$440,579
LANL-20140180ER	Hybrid Shock Ignition as an Alternate Concept for Fusion Energy	$244,180
LANL-20140186ER	One-step Supercritical Fluid Extraction and Separation of Rare Earths	$308,223
LANL-20140200ER	Time Resolved Phonon Spectroscopy for Cryogenic Bolometer Readout	$373,307
LANL-20140216ER	Deciphering the Algal Phycosphere	$381,713
LANL-20140237ER	Measuring Winds in the Stratosphere using Passive Acoustic Sensors	$346,606
LANL-20140252ER	Quantum Kinetics of Neutrinos in the Early Universe and Supernovae	$351,708
LANL-20140261ER	Beyond the Chemical Reaction Zone: Detonation Product Gases in the Warm Dense Regime	$319,393
LANL-20140269ER	Designing the Next Generation Compton Light Source	$322,260
LANL-20140270ER	From the Finite Element Method to the Virtual Element Method.	$388,834
LANL-20140271ER	Topological Kondo Insulators-a definitive test of the theoretical prediction of a new quantum state	$298,833
LANL-20140275ER	Cryogenic Laser Refrigerator for Infrared Imaging	$293,949
LANL-20140293ER	Semi classical Modeling of Non-adiabatic Processes in Molecular Materials	$322,333
LANL-20140302ER	Large Fluctuations in Stochastic Dynamical Systems	$318,690
LANL-20140307ER	Intrinsically Disordered Proteins: New Tools for Old Controversies	$323,109
LANL-20140309ER	Electromagnetic Field Control of Cold Molecular Collisions	$278,383
LANL-20140323ER	Accelerating Time Integration for Multi-scale Simulations	$337,408
LANL-20140348ER	Making nano-Mg a reality-This novel material, nano-Mg, will be more durable, thermally stable, and corrosion resistant than current materials	$300,652
LANL-20140351ER	Combined Klystron and Linac - to reduce the size of portable accelerators for medical and other radiographic missions	$281,988
LANL-20140355ER	Automated Identification and Reverse Engineering of Malware	$308,460
LANL-20140362ER	Matter Wave Circuits-to create the de Broglie wave analog of an integrated optical circuit	$377,928
LANL-20140371ER	Toward Tunable Functionalities Using Epitaxial Nano scaffolding Films	$307,311
LANL-20140389ER	Temporal Graphs - This project develops fundamental mathematical models and algorithms for complex evolving networks such as computer networks and social networks. This work will have direct applications in the fields of cybersecurity and epidemiology	$303,543
LANL-20140396ER	Chemical Shift Signatures of Nuclear Material: 235U and 239Pu NMR spectroscopy	$324,219
LANL-20140406ER	Solid-State Gamma-Ray Detectors Based on Quantum Dots	$347,984
LANL-20140425ER	Agile Persistent Surveillance Networks Using Mobile Platforms	$308,087
LANL-20140433ER	Signatures of Reactor Operations from Plutonium Production samples	$420,555
LANL-20140444ER	Multi-scale Probabilistic Resuspension Modeling of Spores and Radionuclides from Outdoor Surfaces	$321,257
LANL-20140446ER	Direct-gap Group-IV Nanocrystals: Cheap, Versatile Materials for Solar Cells	$348,497
LANL-20140450ER	Understanding of Nanoscale Fracture and Its Application in Developing High Fracture Toughness Nanoscale Composites	$322,565
LANL-20140456ER	Metal and Semiconductor Nanocrystal Super lattices Under Pressure: Multiscale Tuning of Structure and Function	$336,812
LANL-20140458ER	Efficient Method for Large Scale Simulations of Fermionic Gases Interacting with Classical Fields	$334,391
LANL-20140483ER	First Direct Observation of Weibel Instability in Collisionless Shocks	$454,005
LANL-20140495ER	Interactions of Electrons with Quantum-Confined Systems Probed by Scanning Tunneling Spectroscopy	$374,184
LANL-20140504ER	New Chemistry Towards High Purity Uranium and Thorium Nitrides	$325,849
LANL-20140507ER	Integrated Photonics Pathfinder	$189,696

Project ID	Project Name	FY Total
LANL-20140525ER	Multiplexed Light Detection and Ranging of Absorbing Gases	$308,399
LANL-20140540ER	Unraveling Interfacial Charge and Energy Transfer Processes in Single Layer 2D Transition Metal Dichalcogenides	$343,666
LANL-20140546ER	Discovery and Implication of Negative Ions in the Earth's Magnetosphere	$332,910
LANL-20140558ER	Viral Disarmament: A Trojan Protein Approach	$318,720
LANL-20140565DR	Optimization and Control of Dynamic Networks applicable to many domains including cybersecurity and power system applications.	$466,147
LANL-20140566DR	Quantitative Biology: From Molecules to Cellular Function	$437,075
LANL-20140568DR	Research Enabling a Next Generation Neutron Lifetime Measurement	$544,152
LANL-20140575ECR	Effects and Mitigation of Hot Electrons in Direct Drive Implosions	$25,652
LANL-20140580ECR	Laser-Driven Neutron Source for Detection of Nuclear Material	$248,571
LANL-20140581ECR	Microscopic Fission Model for Data Needs	$124,156
LANL-20140591ER	Multi-GeV Electron Radiography design and assemble an electron radiography system	$361,906
LANL-20140605ECR	Relativistic Electrons in Magnetized Plasmas	$214,824
LANL-20140616ER	Photocathodes in Extremes: Understanding and Mitigating High Gradient Effects on Semiconductor Cathodes in X-ray free-electron lasers	$241,959
LANL-20140622ECR	Attosecond Dynamics of Correlated Electrons in f-Electron Materials	$226,285
LANL-20140624ECR	Deciphering Nature's Chemical Toolbox: Decoding the Logic of Biosynthetic Assembly Lines	$204,907
LANL-20140629ECR	Deployment and Installation Technologies for Distributed Measurement Systems in Inconvenient/Hazardous Environments.	$252,936
LANL-20140630ER	Microstructure Based Continuum Process Modeling of Weapons Metals	$378,086
LANL-20140639ER	Solute and Microstructure Prediction during Processing	$546,764
LANL-20140643ER	In situ X-ray Imaging and Diffraction to Understand the Mechanics of Initiation Mechanisms in Explosive Single Crystals	$314,452
LANL-20140645ER	Enabling Mesoscale Science: Nonlocal Dislocation-Flux Crystal Plasticity under Shock Loading Conditions	$323,764
LANL-20140650ER	Embedded Fiber Sensor Approach for Dynamic Pressure and Temperature Measurements in Explosives	$245,743
LANL-20140655ER	Ultrafast Nanocomposite Scintillators: Decay Rate Enhancement by Electromagnetic Coupling to Plasmon Resonances	$246,836
LANL-20140657PRD1	Ultrafast Measurements of Emergent Magnetism in New Complex Oxide Materials	$113,714
LANL-20140658PRD1	Design Principles for High Performance Organic Photovoltaics	$145,845
LANL-20140659PRD1	Synthesis of Novel Energetic Materials	$141,046
LANL-20140660PRD1	Genetically Encoded Tools for Light-controlled Molecular Assembly	$105,541
LANL-20140661PRD1	Investigating Structure-Directing Agents in Nonconventional Nanowire Synthesis Using a Transmission-Electron-Microscope Flow-Cell Holder	$150,896
LANL-20140662PRD1	Tracking Microbial Activity to Predict the Impacts of Climate Change on Ecosystem Function	$141,215
LANL-20140664PRD2	Complexes Containing Redox-Active Ligands for the Synthesis of Fuels from Readily-Available Carbon Sources	$145,753
LANL-20140665PRD2	Investigating Properties of Quark-Gluon Plasma using Jets and Heavy Quark Production at RHIC	$219,403
LANL-20140666PRD2	Bottom-up Chemical Synthesis of Large, Well-Defined, and Organo-Processable Nanographene-based Triarylamine for Optoelectronic Applications	$186,709
LANL-20140667PRD2	Thermodynamics and information processing at the nanoscale	$140,169
LANL-20140668PRD2	Quantum Control of Tailor-designed Photoactive Energetic Materials	$179,294
LANL-20140669PRD2	Mesoscopic Lattice Boltzmann Modeling and Investigation of Boiling Multiphase Flows	$122,782
LANL-20140670PRD2	Petabyte-Scale Computational Analyses of Genomic Data to Elucidate Aging Mechanisms	$175,356
LANL-20140671PRD2	New Tools to Probe Matter with an Electron-Ion Collider	$137,626
LANL-20140672PRD2	Access to Industrially Important Optically Active beta-X-alcohols via Direct Enantioselective Ester Hydrogenation	$210,541
LANL-20140673PRD2	Electric Dipole Moments of Hadrons from Lattice Quantum ChromoDynamics	$127,193
LANL-20140674PRD3	Multi-wavelength Studies of Explosive Astrophysical Transients	$139,801
LANL-20140675PRD3	Ultrafast Carrier Dynamics in Novel Two-Dimensional Nanomaterials	$196,123
LANL-20140676PRD3	New Room Temperature Multiferroic Thin Films Enabled by Strain Engineering	$134,236
LANL-20140677PRD3	Synthesis and X-ray Spectroscopy of Actinide Thiocyanates	$122,211
LANL-20140678PRD3	Search for the Topological States in F-electron Systems	$122,493

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
LANL-20140679PRD3	Rational Design of Multiferroics and Influence of Cationic Disorder on Multiferroicity in Perovskites	$136,359
LANL-20140680PRD3	Shock-Driven Material Dynamics Investigated by Ultrafast X-ray Diffraction	$60,265
LANL-20140681PRD4	Anaerobic, Solvothermal Synthesis of Lanthanide and Actinide Kagomé Antiferromagnets	$118,237
LANL-20140682PRD4	Studies on Functional Materials: Design and Optimization-the cornerstone of the US Materials Genome Initiative	$127,496
LANL-20140683PRD4	Probing and Controlling the Surface States of Topological Insulators	$135,290
LANL-20140684PRD4	Three-Dimensional Nitrogen-Doped Porous Nanographene for High-Performance Supercapacitor	$106,429
LANL-20140685PRD4	Linking scaling and mortality theory to understand climate impacts on vegetation	$48,016
LANL-20150030ER	Global Tree Mortality Prediction Based on Hydraulic Function Failure	$327,430
LANL-20150033DR	SHIELDS: Space Hazards Induced near Earth by Large Dynamic Storms - Understanding, Modeling, Predicting on near-Earth orbiting satellites, and combine computational models with data assimilation methods	$1,633,835
LANL-20150035ER	Reactor Power for Large Displacement Autonomous Underwater Vehicles	$303,821
LANL-20150044DR	k_effective: First Measurement of a Nanosecond-Pulsed Neutron Diagnosed Subcritical Assembly-to predict, detect, and evaluate potential problems of the Nation's aging and changing stockpile	$1,284,923
LANL-20150050DR	Chemical Signatures of Detonation Born From Extreme Conditions	$1,653,627
LANL-20150057DR	Aging in Delta Plutonium Alloys: A Fundamental Approach	$1,173,334
LANL-20150058DR	Multi-Scale Kinetics of Self-Regulating Nuclear Reactors	$1,534,018
LANL-20150065ER	W-Band Synthetic Aperture Radar	$330,011
LANL-20150080ER	Fighting Back Against Pathogens: Discovery and Validation of Novel Drug Targets	$378,104
LANL-20150082DR	A New Approach to Mesoscale Functionality: Emergent Tunable Super lattices	$1,660,899
LANL-20150088DR	Next-Generation Double Beta Decay Experiment	$1,011,944
LANL-20150090DR	Integrated Biosurveillance-the development of diagnostics, and methods to characterize disease-causing pathogens	$1,689,366
LANL-20150098DR	Scalable Codesign Performance Prediction for Computational Physics	$1,514,304
LANL-20150109DR	Meso-Photonic Materials for Tailored Light-Matter Interactions	$1,631,428
LANL-20150127ER	Mapping Relativistic Electron Precipitation: Where and When?	$329,112
LANL-20150215DR	Cyber physical Systems and Security-develop algorithms for detecting, localizing, and defending against attackers in cyber physical systems	$640,493
LANL-20150226ER	Enhanced Photosynthesis through Carbon Concentrating Mechanisms	$371,079
LANL-20150236ER	Exploiting Cross-sensitivity by Bayesian Decoding of Mixed Potential Sensor Arrays	$347,083
LANL-20150242ER	Ocean Acidification over the Last 13,000 yrs	$334,251
LANL-20150298ER	Measurement of Extinct Radionuclides in Historic Nuclear Debris	$334,339
LANL-20150300ER	Ultra-sensitive Parallel Micro-imaging with Atomic Magnetometer	$315,710
LANL-20150303ER	Low Grade Thermal Energy Recovery	$304,950
LANL-20150322ER	Development of pH Responsive Protein Switches to Regulate Energy Capture and Conversion Processes in Photosynthesis	$375,057
LANL-20150323ER	Segregated Fuel-Oxidizer Propulsion for CubeSat Deployment	$301,837
LANL-20150337ER	Practical Antennas from Disruptive Technology	$309,901
LANL-20150375ER	Thin-Film Heat Switch for Active Thermal Management of CubeSat Payloads.	$297,425
LANL-20150394DR	Cold Cathodes for Next Generation Electron Accelerators: Methodologies for Radically Improving Performance and Robustness	$1,786,535
LANL-20150397DR	Critical Watersheds: Climate Change, Tipping Points, and Water Security Impacts	$1,021,315
LANL-20150414ER	Coupled Arbitrary Lagrangian-Eulerian - Adaptive Mesh Refinement for 3D Unstructured Grids	$326,493
LANL-20150431ER	Sub-Grid Meso-Scale Model for Twinning and Slip Processes	$334,590
LANL-20150437ER	Superconducting Nuclear Recoil Sensor for Directional Dark Matter Detection	$332,619
LANL-20150454ER	Methane Coupling Chemistry Promoted by Catalysts Containing Inexpensive Metals	$333,426
LANL-20150467ER	Globally Optimal Sparse Representations-The work is primarily mathematical and computation, consisting of the development of relevant mathematical theory and algorithms	$348,745
LANL-20150476ER	Neutrinos and Fundamental Symmetries in Nuclei	$318,279
LANL-20150485ER	Enabling Automatic Parallelism and Transparent Fault Tolerance	$333,417
LANL-20150498ER	Inserting Nonlinear N-Material Coupling Portable Document Format Information into Turbulent Mixing Models	$328,976

Project ID	Project Name	FY Total
LANL-20150504ER	Higher Order Spin Noise Spectroscopy: from Foundation of Quantum Mechanics to Applications.	$339,404
LANL-20150508ER	Assessing the Quantum Physics Impacts on Future X-ray Free-electron lasers	$320,973
LANL-20150520ER	Transport Properties of Magnetized High-Energy Density Plasmas	$286,396
LANL-20150532ER	Three-Dimensional Porous Nanographene for Highly Efficient Energy Storage	$346,112
LANL-20150541ER	Towards Generating Laboratory Gigagauss Magnetic Fields and Their Impact on Inertial Confinement Fusion Dynamics	$194,796
LANL-20150557ER	Long-time Dynamics using Trajectory Splicing	$321,463
LANL-20150567ER	Controlled Helium Release from Composite Plasma Facing Materials through Interface Design	$356,287
LANL-20150568ER	Magnetic Rayleigh-Taylor Instability-aims to answer if magnetic fields can control or constrain hydrodynamic instabilities	$303,203
LANL-20150575ER	Fundamental Actinium Science In Search of Radiotherapeutics	$331,639
LANL-20150577ER	Enhancing the Long-Baseline Neutrino Experiment Oscillation Sensitivities with Neutron Measurements	$650,218
LANL-20150594ER	Spatial and Extreme Value Processes for Bridging Micro- and Macro-Scales in Materials	$325,596
LANL-20150604ER	Precision 'Bottom-Up' Fabrication of Non-classical Photon Sources	$308,479
LANL-20150612ER	Perovskite Solar Cells: The Next Frontier in Energy Harvesting	$342,752
LANL-20150613ER	Defect-Induced Emergent Magnetism in (Nonmagnetic) Complex Oxides and their Interfaces	$313,104
LANL-20150623ER	Energetic Materials Cocrystal Engineering: Toward Superior Munitions	$329,985
LANL-20150628ER	Majorana Fermions for Quantum Information	$388,637
LANL-20150646DR	Nuclear Science for Signatures, Energy, Security, Environment-support research in nuclear science by attracting and funding projects of a future generation of scientists and engineers	$1,257,067
LANL-20150647DR	Signatures of Change - Habitat Earth - To expand the scientific understanding of fundamental physical processes that are critical to maintenance of habitat earth homeostasis	$1,506,369
LANL-20150656ECR	Electron Transport in Warm and Hot Dense Matter	$146,877
LANL-20150659ECR	Controlling the Electronic Structure of Emerging Atomically Thin Materials Through Heterostructuring	$157,744
LANL-20150664ECR	Trojan Horse Drug Development Approach: Targeting Gene Dosage Control to Induce Bacterial Suicide	$153,854
LANL-20150673ECR	Hand-held Laser-Ultrasound Two-Dimensional Scanner	$163,567
LANL-20150683ECR	A Step toward Nuclear Reaction Studies for Applications at Facility for Rare Isotope Beams	$121,230
LANL-20150688ECR	Remote Whispering Applying Time Reversal-provides a secure communications tool to communicate to a targeted individual/location without that target having specialized equipment	$156,010
LANL-20150690ECR	Optimization of Compton Source Performance through Electron Beam Shaping	$155,593
LANL-20150691ECR	Reducing Data Dimensionality in Seismic Inversion	$64,558
LANL-20150693ECR	Toward a Coupled Multi-physics Modeling Framework for Induced Seismicity	$47,689
LANL-20150696ECR	A Novel Crystal Plasticity Model that Explicitly Accounts for Energy Storage and Dissipation at Material Interfaces	$152,731
LANL-20150700PRD1	A Physics-Based Numerical Model for Next-Generation Laminar Flow Batteries	$98,834
LANL-20150701PRD1	Ultra-Sensitive Micro-Magnetic Imaging Endoscope	$84,539
LANL-20150702PRD1	Uniaxial Pressure to Elucidate Complex Electronic States in Actinides	$7,471
LANL-20150703PRD1	Resolving Kinetic Scales in 3D Global Magnetosphere Simulations	$84,624
LANL-20150704PRD1	Photophysical Properties of Self-Assembled Nanoclusters	$97,165
LANL-20150705PRD2	Development of Radiation Detector Simulation Framework and Safeguards Instrumentation	$75,487
LANL-20150707PRD2	Dynamic Strength and Phase Transition Kinetics in Geophysical Materials	$113,476
LANL-20150708PRD2	Low-cost High-resolution Sensing and Health Monitoring of Urban Infrastructure	$33,591
LANL-20150709PRD2	In-situ, 3D characterization of solidification in metals	$82,099
LANL-20150710PRD2	New Physics in New Materials-to use applied pressure as a tuning parameter to explore for similar or more likely new physics in new magnetically ordered materials	$46,426
LANL-20150711PRD2	Remediation Process Simulation-Optimization under Complex Uncertainties	$57,527
LANL-20150712PRD2	Neutron Star Mergers Revisited-the primary candidates for the advanced gravitational wave detectors	$5,814
LANL-20150713PRD2	Dendritic microstructure selection in cast metallic alloys	$68,748

	United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
LANL-20150714ER	Feasibility Study of Novel Fabrication of Dielectric Structures for W-Band Synthetic Aperture Radar for Satellite Deployment	$165,115
LANL-20150715ER	Building a Foundation for Understanding How Pathogens Subvert the Host Immune System	$207,848
LANL-20150717PRD2	Studying nuclear astrophysics and inertial fusion with gamma-rays	$51,093
LANL-20150741PRD3	A Kinetic Theory Based Study of Type II Core-Collapse Supernovae	$19,968
LANL-20150742PRD3	Additively Manufactured High Explosive Materials with Controlled Mesostructure for Tuned Detonation Performance.	$23,739
LANL-20150743PRD3	Catalytic Generation of Gas Using Formic and Oxalic Acids for Pressure/Volume Work	$19,070
LANL-20150744PRD3	Climate Correlates of Tree Mortality Patterns and Causes of Forest Mortality	$25,205
LANL-20150750ER	Materials Dynamics via Large-Scale Molecular Dynamics and Embedded Scale-Bridging Simulations	$129,618
LANL-20150751ER	Extreme-Scale Kinetic Plasma Modeling of Turbulence and Mix Using Vector Particle-in-cell	$147,079
LANL-20150752ER	Deep Sparse Columnar Neural Network	$100,130
LANL-20150753ER	Additive Manufacturing of Mesoscale Energetic Materials: Tailoring Explosive Response through Controlled 3D Microstructure	$92,524
LANL-20150755ER	Advancing Regenerative Medicine with Trinity: Defining a New State-of-the-Art for Biomolecular Simulation	$85,211
LANL-20150758PRD3	Ab Initio Modeling of Organometal Halide Perovskites for Photovoltaic Applications	$21,145
LANL-20150759PRD3	Novel Routes to Emergent Functionality in Multiferroics	$24,949
LANL-20159999ER	Residual costs from projects that ended September 30, 2014.	$241,294
	Total # of Projects for LANL: 279 **Total Cost for LANL:** $115,753,388	
	Total Administrative Cost: $2,101,424	
LBNL - L. Berkeley National Lab		
LB13001	Probing Point Defect Dynamics in Solids with Short Ion Beam Pulses	$274,945
LB13007	High-Performance Parallel Analysis for Key Genomics Computations	$271,226
LB13009	Spot Suite - Towards an End-to-End Solution for Light Source Data	$284,356
LB13010	Computational Approaches to Understanding Ultrafast Science	$179,168
LB13019	Extracting Natural Surfactant from Earth Sediments for Economical Oil/Gas Recovery	$191,835
LB13022	Developing Epigenomic Technologies to Interrogate Genome Functions Relevant for Environment and Bioenergy	$156,513
LB13027	Probing Dynamics of Electron Transfer for Microbial-based Energy Interconversion	$70,510
LB13028	Functional Genomic Encyclopedia of Bacteria and Archaea: Evidence-Based Annotation of the Microbial Tree of Life	$323,544
LB13033	Higher Performance Carge Couple Devices for Next Generation Dark Energy Experiments	$239,374
LB13036	New Algorithms for Performing and Analyzing Large-Scale Electronic Structure Calculations	$290,699
LB13037	4D Dynamics of Epigenome Regulation in Response to Environmental Challenges	$427,095
LB13038	Ultra-high Resolution Microscopy of Nano-materials by Scanning X-ray Diffraction Microscopy	$201,969
LB13040	Search and Synthesis of the Next Generation of Topological Insulators	$272,347
LB13041	Using Experiments and Numerical Models to Examine Ecosystem and Land Management Interactions with Atmosphere and Climate	$303,648
LB13045	Creating the vehicle-to-grid simulation platform for predicting the impact and optimally integrating plug-in electric vehicles on the electricity grid	$244,985
LB14001	Towards the Development of a Fiber Based Laser Plasma Accelerator and Assessment of its Utility for Potential Biomedical Applications	$258,560
LB14002	High-Accuracy Scalable Solvers for Modeling of Future Ultrafast Photon Sources	$305,956
LB14003	Novel Accelerator Techniques for Diffraction Limited Light Sources	$1,659,774
LB14004	Probing Dynamics with Multi-Color, Multi-Pulse Laser and Synchrotron Photons	$313,291
LB14005	Design of Mesoscale Catalyst Networks	$465,619
LB14006	Designing Fluctuations and Dynamics of Enzyme Catalytic Networks	$207,920
LB14007	Computational-Experimental Studies of Aerosol Transformations from the Liquid to Glassy State	$214,556
LB14008	Graph-Based Analysis and Visualization of Multimodal Multi-Resolution Large-Scale Neuroimaging Data	$458,368
LB14009	Advanced Computational Chemistry and Semantic Data Tools for Mesoscale Science	$338,011
LB14010	High-Order Implicit Interface Methods for Complex Fluid Flow and Multiple Interface Dynamics	$197,733

Project ID	Project Name	FY Total
LB14011	A Graphene-Based Platform for Correlative Electron and Super-Resolution Microscopy	$150,121
LB14012	Application of Virtual Grind-Integration Laboratory	$387,404
LB14015	Quantifying the Dynamics of Natural Organic Matter Conformation and Reactivity	$241,883
LB14016	Modification of the Genetic Code to Construct a Safe Industrial Microbe for Synthetic Biology	$172,359
LB14017	Sequencing-Based Functional Genomic in-Vivo Characterization of Plant Promoters	$148,073
LB14018	Development of a Cas9 Based Resource for Genome Engineering	$313,761
LB14019	Toward Laser Spectroscopy of Transfermium Elements	$205,798
LB14020	Next Generation Silicon-Based Tracking and Massive Online Data Processing for Collider Experiments	$217,416
LB14021	Enhancing the Design-Build-Test-Learn Cycle for Metabolic Engineering	$674,142
LB14022	Tactical High Throughput Computing: Improving Interdisciplinary Tools for High Throughput Computing at the National Energy Research Scientific Computing Center, and Beyond.	$153,374
LB14023	Advanced Composites for Next Generation Scientific Instruments	$398,320
LB14024	Next Generation Cosmic Microwave Background Detector Arrays: Enabling a Factor 10-100 Increase in Array Size.	$257,685
LB14025	Dynamic Studies of Mesoscale Electronic Ordering in Complex Materials	$299,161
LB14026	Codesigning Big Iron for Big Data	$383,747
LB14027	Reinventing Pre-Clinical and Environmental Testing Paradigms	$516,964
LB14028	Responsive Nanoparticle Assemblies	$356,244
LB14029	Using Differential Electrochemical Mass Spectrometry to Characterize Catalytic Processes in Li-Air Batteries	$149,747
LB14031	Neuro/Nano Technology for Brain Mapping	$831,311
LB14033	Hard X-Ray Photoemission for Materials Science	$194,102
LB15001	A New Concept for High Average Power Ultrafast Lasers	$416,301
LB15002	Tender Resonant X-ray Scattering: A Spatio-Chemical Probe for Materials, Biology and Energy Sciences	$259,089
LB15003	High Efficiency Soft X-ray In-situ Spectroscopy for Advanced Light Source-II Energy Sciences	$179,568
LB15004	High Performance Geometric Multigrid For a New TOP500 Computer Architecture Benchmark	$237,762
LB15005	Unconstrained Functionals for Massively Parallel Scaling of Conjugate Gradient Eigensolvers	$298,324
LB15006	Surrogate Model Algorithms for Optimization Problems	$219,361
LB15007	Fast Numerical Methods for Green's Function in Mesoscale Simulation	$63,040
LB15008	EXtreme Data Analysis for Cosmology	$272,205
LB15009	Mesoscale Structuring of Surfaces for Energy and Water Applications	$115,936
LB15010	Next Generation Water Technologies for the Developing World	$319,352
LB15011	The International Database of Efficient Appliances: A New Tool for Optimizing Energy-Efficiency	$149,348
LB15012	Advanced Combustion Technology for Transportation Refrigeration Units	$284,294
LB15013	Behavior Analytics	$310,097
LB15014	Novel Magnetic Field Mapping Technology For Small And Closed Aperture Undulators	$215,861
LB15015	Harnessing the Soil Microbiome for Food and Fuel Security	$892,321
LB15016	The Soil Metazoan Microbiome: A Key Functional Compartment of Importance to Plant Health and Root C Stabilization	$275,312
LB15017	Cracking the Earth: Thermal-Hydrological-Mechanical Modeling and Simulation of Fracture Propagation in Geomaterials	$268,250
LB15018	Fracture Characterization During and After Multistage Hydraulic Fracturing in Unconventional Gas Reserves Using Temperature Data	$157,458
LB15019	Frequency-Modulated Hydraulic Fracturing for Secure and Efficient Reservoir Permeability Enhancement	$193,561
LB15020	Discovery and Transfer of Novel Pathways for Phosphate Solubilization	$185,913
LB15021	Tackling Microbial-Mediated Plant Carbon Decomposition Using Function-Driven Genomics	$175,774
LB15022	Microbiome Adaptation in Response to Environmental Challenges	$833,902
LB15023	Artificial Carboxysomes for CO2 Capture and Conversion in a Single Object	$277,811
LB15024	Synthesis of Bio-Inspired Adaptive Membranes for Direct Capture of CO2 from Biogas	$133,902

Project ID	Project Name	FY Total
LB15025	Understanding Radiation-Induced Photo-Electron Chemistry in High-Cross Section Organometallic Resist Materials	$304,163
LB15026	Computational Design of Smart Complex Oxides with Tunable Quantum Phases	$227,263
LB15027	Computational Nuclear Physics Code Developments for Fundamental Interactions/Astrophysics	$85,790
LB15028	Multi-Disciplinary Research to Enhance Understanding of Transport, Risks, and Mitigation of Radioisotopes for Improved Radiological Resilience	$580,822
LB15029	Advanced Computational Tools for High Resolution Cryo-Electron Microscopy	$272,247
LB15030	Searches for the Supersymmetric Particles at the Large Hadron Collider in Run-2 and Beyond	$274,566
LB15031	Confronting Beyond the Standard Model Theories with New Large Hadron Collider and Astrophysical Data	$248,862
LB15032	ESnet Network Operating System	$301,142
LB15033	Clay Interlayer Stratification: Implications for Ion Exchange and the Mobility of Neutral Molecules in Shales	$132,015
LB15034	Development of a Clustered Regularly Interspaced Short Palindromic Knockout System for Streptomyces Venezuelae	$179,411
LB15035	Next-Generation Neutrino and Rare-Event Detection	$234,872
LB15036	Optical and Electrical Characterization of 2-Dimensional Nano sheets without Naturally Layered Structure	$94,211
LB15037	Interfacing Chemical and Biological Catalysis for Solar-to-Fuel Conversion	$148,792
LB15038	Coherent Information Propagation in Superconducting Qubit Trimers	$356,166
LB15039	High-Performance Chemical Identification for Hyperspectral Data Science	$306,338
LB15040	Analyzing the Microbial Response of Nutrient Loading in the Maumee River Agricultural Watershed Towards the Formation of Algal Blooms	$59,953
LB15041	Solving Problems in Materials Theory via Quantum Networks	$12,157
LB15042	Life Science Applications of Xray Scattering at Advanced Light Source Upgrade	$16,305
	Total # of Projects for LBNL: 86 **Total Cost for LBNL:** $24,773,431	
	Administrative Cost Paid by Laboratory Overhead	

LLNL - L. Livermore National Lab

Project ID	Project Name	FY Total
12-ERD-026	An Open Framework to Explore Node-Level Programming Models for Exascale Architectures	$172,610
12-ERD-073	Carbon Nanometer-Scale Membrane Channels	$184,220
13-ERD-002	Coupled Segmentation of Industrial Computed Tomographic Images	$659,410
13-ERD-004	A Three-Dimensional Radioisotope Battery	$209,650
13-ERD-009	Micro-Reflector Array for High-Speed Directed-Light-Field Projection	$412,640
13-ERD-016	Radio-Frequency Noise in Superconducting Devices	$213,840
13-ERD-020	Detection of Novel Infectious Agents from Clinical Samples Through Immunoglobulin M and Toll-Like Receptor Capture	$376,190
13-ERD-022	Rapid Synthesis, Functionalization, and Assembly of Nanometer-Scale Particles for Designer Materials	$405,320
13-ERD-023	Illuminating the Dark Universe with the Sequoia Supercomputer	$325,050
13-ERD-025	Data-Centric Computing Architecture to address memory bandwidth and capacity issues for data-intensive supercomputing	$1,156,160
13-ERD-029	Reactive Materials for Hydraulic Fracturing	$623,920
13-ERD-030	Unraveling the Physics of Nanometer-Scale Fluidic Phenomena at the Single-Molecule Level	$381,570
13-ERD-031	Fast Running Codes via High-Fidelity Reduced-Order Models	$452,560
13-ERD-032	Selecting Better Models for Climate Change Detection and Attribution	$197,000
13-ERD-033	Neutron Star Science with the Nuclear Spectroscopic Telescope Array	$175,010
13-ERD-036	Radiochemical Measurements of Nuclear Reactions at the National Ignition Facility	$975,990
13-ERD-038	Complex Electronic Structure of Rare Earth Activators in Scintillators	$500,190
13-ERD-042	Optimizing Drug Efficacy through Pharmacogenomics-Driven Personalized Therapy	$599,620
13-ERD-043	Large-Scale Integrated Electric Transmission and Distribution Grid Dynamic Simulation	$1,275,920
13-ERD-044	Theoretical and Computational Studies of Rare Earth Substitutes: A Test Bed for Accelerated Materials Development	$407,920
13-ERD-046	A Hybrid Content- and Concept-Based Approach to Large-Scale Video Analytics	$597,290
13-ERD-047	Simulation of Engineering Fracture and Fragmentation	$240,240
13-ERD-048	Hard X-Ray Mirrors for Nuclear Security	$331,830
13-ERD-051	High-Explosive Components Using Advanced Manufacturing Methods	$613,460

	United States Department of Energy	
	Laboratory, Plant or Site Directed Research and Development Report	
	Project List -- Fiscal Year 2015	
Project ID	**Project Name**	**FY Total**
13-ERD-055	Task Mapping on Complex Computer Network Topologies for Improved Performance	$315,270
13-ERD-056	Next-Generation Process for Tritium Recovery from Fusion Power Plant Blankets	$577,700
13-ERD-058	Transient Loading Effects on Structural Materials for Laser Inertial Fusion Energy	$348,880
13-ERD-062	Dynamic Predictive Analytics Approach to Comprehensive Nuclear Forensic Analysis	$400,610
13-ERD-063	Measuring Dark Energy with the Large Synoptic Survey Telescope	$297,650
13-ERD-067	Quantum Monte Carlo Benchmarks for Materials on Demand	$273,280
13-ERD-072	Scalable, Revealing Factorizations of Directed Graphs and Hypergraphs	$484,300
13-ERD-073	Generation and Characterization of Matter at Extreme Gigabar Pressures at the National Ignition Facility	$345,060
13-ERD-078	Strength and Phase Transformation Kinetics Under Dynamic Compression	$276,040
13-LW-003	Why Is Nuclear Matter So Red? A realistic understanding of astrophysical phenomenon and the interior of nuclear devices	$200,540
13-LW-032	Wonder Bugs and the Carbon Cycle: Characterizing the Carbon Metabolism of Thaumarchaeota	$161,670
13-LW-076	A Compact, Femtosecond Hard X-Ray Source for Materials Characterization and High-Energy-Density Science	$116,460
13-SI-001	Giga-Shot Optical Laser Demonstrator	$1,497,870
13-SI-002	Accelerated Certification for Additively Manufactured Metals	$2,729,150
13-SI-004	Continuous Network Cartography	$1,420,150
14-ERD-001	A Coupled Seismic and Acoustic Simulation Capability	$428,130
14-ERD-005	Biological Printing of Vasculature for Artificially Grown Tissue	$767,440
14-ERD-006	Atmospheric Source Reconstruction with Uncertainty Quantification	$326,840
14-ERD-010	Enzyme-Embedded, Microstructural Reactors for Industrial Biocatalysis	$485,400
14-ERD-013	Parallel Time Integration for High-Performance Computing	$405,180
14-ERD-014	Picosecond Laser Interactions with Materials: Mechanisms, Material Lifetime, and Performance Optimization	$980,770
14-ERD-018	Time-Dependent Measurement of Carbon Condensation and Void Collapse in Detonating High Explosives	$648,750
14-ERD-020	IPv6 Protocol Research - Examining security vulnerabilities	$449,030
14-ERD-024	Enabling Multiscale Simulations of Atmospheric Flow over Complex Terrain in Earth System Models	$597,780
14-ERD-025	Structural Freestanding Films with Atomic-Scale Thickness	$712,680
14-ERD-028	Application of Imposed Magnetic Fields to Ignition and Thermonuclear Burn at the National Ignition Facility	$1,095,520
14-ERD-031	Advanced Double-Shell Target Designs for Inertial Fusion Energy	$257,740
14-ERD-032	Advanced Discretization Techniques for Paraxial Laser Propagation	$61,550
14-ERD-034	Nuclear Fission in a Plasma	$129,950
14-ERD-035	Ternary Alloy Development for Enhanced Safety and Performance of Fusion Systems	$620,390
14-ERD-038	Wetlands as a Source of Atmospheric Methane: A Multiscale and Multidisciplinary Approach	$486,540
14-ERD-039	Improved Sensor Performance Using Innovative Algorithms	$233,440
14-ERD-040	Thermal Management of High-Heat-Flux Laser Diodes Using Liquid-Vapor Phase Change	$687,870
14-ERD-041	From Topological Surfaces to Magnetic Collapse of f-Shell Electron Quantum Materials	$550,270
14-ERD-042	Understanding the Creation and Reduction of Surface Microscale Roughness During Processing of Glass Optics	$936,560
14-ERD-048	Cyclodextrin-Based Nanometer-Scale Scaffolds for Capture and Catalytic Degradation of Chemical Warfare Agents	$360,260
14-ERD-051	Real-Time Microseismic Processing for Induced Seismicity Hazard Detection	$425,600
14-ERD-056	Real-Time Adaptive X-Ray Optics	$580,560
14-ERD-058	Superluminal Radiating System	$811,040
14-ERD-062	Planetary-Scale Agent Simulations	$834,190
14-ERD-064	Multifunctional Metamaterials	$221,700
14-ERD-065	Computation Power at Scale - Exploring approaches to influence the design of new exascale computing systems to maximize performance per watt of power	$331,800
14-ERD-067	Advanced Synthesis and Characterization Techniques for Ultrahard Film Growth	$607,860
14-ERD-070	Multichannel Air-Guiding Fibers to Transport Extreme Lasers and Enable High-Flux Particle Accelerators	$734,910
14-ERD-076	Exploiting the Gemini Planet Imager: Revolutionary Exoplanet Science and Advanced Adaptive Optics	$368,280
14-ERD-077	High-Temperature Plasma-Chemistry Kinetics Test Bed	$580,320

	United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
14-ERD-078	Short-Wavelength, High-Power Fiber Laser Sources	$480,730
14-ERD-081	Rapid Detection and Characterization of Emerging Foreign Animal Disease Pathogens	$625,720
14-ERD-082	Improving Resonance Ionization Mass Spectrometry for Next-Generation Nuclear Forensics	$478,210
14-ERD-084	High-Average-Power Diffraction Pulse-Compression Gratings Enabling Next-Generation Ultrafast Laser Systems	$930,050
14-ERD-087	Optimal Fabrication Methodologies for Additive Manufacturing	$349,210
14-ERD-091	Analysis of a Metabolically Engineered Microbial Consortium for Optimal Production of Biofuels	$373,770
14-ERD-094	Extending Atomistic Simulation to Mesoscale in Time and Length	$364,320
14-ERD-095	Statistical and Dynamical Approaches to Probabilistic Decadal Climate Prediction	$429,380
14-ERD-098	Laser-Matter Coupling Mechanisms Under Varying Chemical and Particulate Surface Configurations	$851,490
14-ERD-100	The Livermore Brain: Massive Deep-Learning Networks Enabled by High-Performance Computing	$1,024,430
14-ERD-101	Plasma Interactions with Mixed Materials and Impurity Transport	$481,960
14-ERD-103	Modeling Materials Under Strongly Driven Conditions - Developing and applying computational techniques to describe material behavior under strongly driven conditions	$356,240
14-LW-009	Developing a Compact, High-Power Pulsed Generator System	$139,540
14-LW-073	The World's Lowest Nuclear State in Thorium-299m	$287,210
14-LW-077	New Steady-State Viral Culturing Platform for Infectious-Disease Therapeutics	$298,310
14-LW-079	Detecting and Partitioning Carbon Dioxide Fluxes	$195,980
14-LW-087	Solving the Reactor Antineutrino Anomaly	$294,970
14-LW-091	Testing Hypotheses of the Little Ice Age and Holocene Climate Change	$271,550
14-SI-001	In Vitro Chip-Based Human Investigational Platform	$2,246,730
14-SI-002	Scalable High-Order Computational Multiphysics at Extreme Scale	$1,506,650
14-SI-003	Physical States and Processes in Inertial-Confinement Fusion: Matter at Extreme Energy Density	$1,278,700
14-SI-004	Deterministic Multifunctional Materials and Manufacturing Initiative	$3,283,210
14-SI-005	Cooperative Constellations: Resilient, Persistent, and Flexible Satellite Systems	$2,021,460
15-ERD-006	Microstructure Evolution During Rapid Solidification: In Situ Characterization and Mesoscale Modeling	$540,270
15-ERD-009	Revisiting Phase-Locking Laser Diode Arrays	$558,890
15-ERD-010	Dynamic Stimulation of Geologic Resources	$677,910
15-ERD-012	Melting and Solidification in Multicomponent Materials: Constraints on the Search for Habitable Planets	$379,480
15-ERD-013	Quantum Simulations for Strongly Correlated Materials with High Atomic Numbers	$443,570
15-ERD-014	Answering Fundamental Physics Questions with the Neutrino	$577,070
15-ERD-015	Precision Gamma-Ray Signatures for Long-Lived Radioactive Nuclei	$398,470
15-ERD-017	Unraveling the Burkholderia Pathogen Infection	$690,180
15-ERD-019	Accelerated Development of Multiscale Materials	$839,140
15-ERD-020	Chemically Stable and Optically Transparent Vapor-Deposited Plastics	$506,530
15-ERD-021	Neutrino Science with a Kiloton-Scale Water Detector	$312,240
15-ERD-022	Integrated Mesoscale Approach for Predicting Ionic Conductivity in Solid Electrolytes	$495,850
15-ERD-023	New Computational Methods for Scalable Genome Variation Discovery	$587,620
15-ERD-026	X-Ray Free-Electron Laser Science for High-Energy-Density Experiments	$500,310
15-ERD-028	Acceleration of Ptychographic Microscopy Reconstruction	$173,900
15-ERD-030	Rational Design and Optimization of Additively Manufactured Carbon-Fiber-Reinforced Composites	$742,530
15-ERD-032	Algorithm for First-Principles Molecular Dynamics of Metals at Extreme Scales	$368,520
15-ERD-034	A Dense Plasma Focus Device as a Compact Neutron Source	$314,400
15-ERD-036	Energetic Ligands for High-Power Metal Complexes	$394,380
15-ERD-037	Physics of Laser-Assisted Advanced Manufacturing Processes	$903,510
15-ERD-038	Application-Driven Research into Multiscale Modeling of Laser-Plasma Interactions	$543,210
15-ERD-039	Failure Recovery Abstractions for Large-Scale Parallel Applications	$263,980
15-ERD-041	Decomposition Methods for Power Grid Optimization	$500,340
15-ERD-042	Tracking Water through the Critical Zone to Assess Drought Vulnerability	$539,750
15-ERD-043	Manipulating Optical and Electromagnetic Properties Through Hierarchical Metamaterials	$465,320
15-ERD-044	New Candidate Booster and Detonator Materials	$182,170

	United States Department of Energy	
	Laboratory, Plant or Site Directed Research and Development Report	
	Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
15-ERD-046	Single-Shock Platform for Activation Studies with a Prompt Source of Fast Neutrons	$391,660
15-ERD-050	All-Source Data Fusion for Detecting and Monitoring Threats on a Global Scale	$669,700
15-ERD-051	Integrated Physics-Based Noise Modeling of Qubit Devices	$495,830
15-ERD-052	Transport and the Equation of State for Asymmetric Plasma Mixtures	$480,490
15-ERD-053	Predictive Models Based on Disjoint Feature Sets for Applications in Biomedicine and Cyber Security	$552,140
15-ERD-054	Creation and Study of Ultrahigh-Energy-Density Matter Using Nanometer-Scale Structured Targets	$249,160
15-ERD-055	Single-Shot Optical Recorder with Picosecond Resolution and Nanosecond Record Length	$297,940
15-ERD-056	Photonic Processors for High-Fidelity Diagnostics	$578,370
15-ERD-057	Next-Generation Films for High-Performance Optoelectronics Applications	$940,290
15-ERD-058	Advanced Fusion Target Capsule Concepts	$391,060
15-ERD-059	Coupling Monte Carlo Neutral and Fluid Plasma Models for Edge Simulation in Magnetic Fusion	$350,680
15-ERD-062	New Physics from Collisions at the Large Hadron Collider	$264,090
15-ERD-063	Liquid Condensation and Solidification Behavior of Hydrogen Isotopes in Foams	$409,320
15-ERD-064	Multiframe, Single Line-of-Sight X-Ray Imager for Burning Plasmas	$223,130
15-ERD-065	Collisionless Shock Formation in Laser-Generated Plasma Streams	$346,970
15-ERD-066	Self-Consistent, Three-Dimensional Calculations of Electromagnetic Pulse Propagation	$466,090
15-ERD-067	Compton-Scattering X-Ray Generation from Compact X-Band Accelerators	$1,004,930
15-ERD-068	Increasing Capacity of Flow-Through Electrode Capacitive Desalination with Phased Charging	$295,820
15-ERD-069	Capture Cross Sections For Isotopes Far From Stability	$201,750
15-FS-003	Nonlinear Spectroscopy Study of Fuel Layer Uniformity in Inertial-Confinement Fusion Targets	$124,930
15-FS-005	Unified Description of Quantum Many-Body Systems	$83,330
15-FS-006	Mesoscale-Crystal Architectures	$121,990
15-FS-007	Optimizing High Harmonic Generation in Ionized Plasma for Seeding of X-Ray Free-Electron Lasers	$81,110
15-FS-008	Laser-Induced Aerodynamic Failure of Ramjet Engines	$87,740
15-FS-009	Feasibility of Conductive Cooling for New High-Repetition-Rate Laser Systems	$124,990
15-FS-010	Advanced Forensic Proteomic Analysis Methods	$124,270
15-FS-011	Highly Sensitive Electro-Optic Modulators	$123,270
15-FS-013	Advanced Manufacturing Approaches for Long-Wave Diffraction Gratings	$73,240
15-FS-014	Numerical Performance and Parallel Scalability of Multi-Rate Integrators Based on Discrete-Event Simulation	$39,700
15-LW-002	X-Ray Pump-and-Probe Experiments with a Free-Electron Laser	$289,540
15-LW-013	Engineering Bacterial Cell-Like Compartments as Platforms for Synthetic Biology	$300,220
15-LW-018	Spin-Based Broadband Terahertz Radiation from Topological Insulators	$306,230
15-LW-023	Nanometer-Scale Particle Platform for Drug Delivery to the Brain	$298,850
15-LW-029	Validating Large Fluid-Dynamics Simulations of Complex Geometries with Three-Dimensional Printing	$300,180
15-LW-067	Hydrogen Diffusion in Earth's Upper Mantle	$235,010
15-LW-074	Freeze-Drying Aerosols: A Facile Route to Metal Particles with Nanometer-Scale Pores	$292,480
15-LW-083	Ultralight Mechanical Metamaterials with Ordered Hierarchies	$295,280
15-LW-095	Particle Acceleration from Laser-Driven Collisionless Shocks	$258,400
15-SI-002	Development of a Virtual Human Heart to Predict the Pharmacology of Novel Drugs	$1,740,510
	Total # of Projects for LLNL: 158 **Total Cost for LLNL:** $83,030,640	
	Total Administrative Cost: $1,966,399	
NNSS - Nevada National Security Site		
J1701023	Ultrafast All-Optical Framing Technology	$218,188
J1701044	Ionospheric Plasma Coupling to Low-Frequency Electromagnetic Radiation	$347,418
J1701045	Laser-Generated Ultra-High-Energy Density Plasma	$261,127
J1701093	Development of an X-ray Radar Imaging Technique for 3-D Scene Scanning	$1,292
J1701195	Enhanced Dynamic Materials Research	$718,396
J1701223	Solid-state Neutron Detectors using Uranium Oxides	$284,099
J1702025	High Miller-Index Crystal Exploration	$140,125
J1702035	High Yield X-Ray Photocathodes	$142,250
J1703013	Methylenedioxypyrovalerone and Large Data-set Statistics	$442

Project ID	Project Name	FY Total
J1703015	Advanced Data Analysis Techniques	$165,347
J1703025	Quantifying Uncertainties through Advanced Theoretical Analysis	$293,505
J1703084	Grain-SelectiveMethylenedioxypyrovalerone Experiments	$261,274
J1703165	Shock Propagation & Failure Mechanisms Characterization	$236,449
J1703184	Optimizing Dense Plasma Focus Neutron Output using Particle-in-Cell and Magnetohydrodynamics Models	$223,971
J1703244	Three-Dimensional Seismic-Attribute Model for Yucca Flat	$205,492
J1703264	High-Resolution Flash Neutron Radiography of Dense Objects	$16,421
J1704024	Advanced Modeling and Uncertainty Quantification for the Aerial Measurement System	$119,177
J1704025	Networked Radiation Detection System	$241,851
J1705035	Time Resolved Phase Transition Kinetics	$209,280
J1705044	Dynamic Recompression of Damaged Materials	$4,027
J1705045	Optical Ranging for Shocked Surfaces	$294,405
J1705054	Laser-induced breakdown spectrometry as a Surrogate for Large Scale Detonations and Means to Characterize Intermediates	$289,938
J1705055	Grooved Graded Density Impactor	$145,462
J1705193	An Experimental and Theoretical Investigation into the Chemical Properties of Uranium and Thorium Ions in the Gas-Phase and on Surfaces	$228,610
J1705224	New Methods to Quantify Thermodynamic and Phase Properties of Shocked Materials	$3,917
J1705324	Ultra-High Sensitivity Fiber-Optic Links	$236,531
J1705333	Secure Sensor Networks using Direct-Sequence Spread-Spectrum	$27,939
J1706063	Novel Deployment of Elpasolites as a Dual Gamma Neutron Directional Detector	$55,487
J1706075	Concurrent Transceiver with Ultra-High-Speed Fourier	$131,217
J1706095	Enhanced Radiation Detection	$629,774
J1706155	Low-Cost Multiple Unmanned Aircraft	$625,606
J1706215	Transition Edge Sensor	$213,748
J1706234	Predictive Radiological Background Distributions from Geologic Data	$201,369
J1706254	Development of Fluorescent Technetium Compounds as a Radioactive Distributed Source	$107,897
J1706255	Spatial Clustering Techniques	$89,514
J170FS14	Anti-Neutrino Flux Monitored by Changes in Beta Decay Rates	$1,513
J170FS15	Spectroscopic Technique	$38,841
J170FS25	Neutron Refractive Index	$10,941
J170FS35	Soft X-Ray Pyrometer	$26,116
Total # of Projects for NNSS : 39 **Total Cost for NNSS :** $7,448,956		
Total Administrative Cost: $1,388,905		
NREL - National Renewable Energy Lab		
6001010	Crosswalk - Costs from Closed Projects	$67,849
6271202	An Integrated Bio hybrid Approach for Photocatalytic Production of Higher Alcohols	$29,066
6271301	Synthetic Tricarboxylic Acid Cycle for Photobiological Production of Ethylene from Cyanobacteria	$83,189
6271401	Next Generation in planta Expression of Glycoside Hydrolases: Reduction in Plant Cell Wall Recalcitrance	$194,647
6271403	An Evolutionary Approach to Increase the Tolerance to Biomass Hydrolysates in Clostridium Thermocellum	$153,113
6271501	Cellulose Biosynthesis Mechanisms	$150,906
6271502	Coupling Photoexcited Electron-Transfer to the Carbon and Nitrogen Reduction Reactions by Nitrogenase-Nanoparticle Bio hybrid Complexes	$62,041
6271503	Cellulosic Nanocrystals	$94,897
6271504	Integrated Approach to Connect Genetic Profiles with Microstructural Phenotypes Involved in Biofuel Production in Green Algae	$42,389
062C1301	Integrated Energy Management and Analysis for the Energy Systems Integration Facility's Computational Systems	$66,169
062C1501	Next-generation Multi-scale Computational Fluid Dynamics for Wind Farm Simulations	$29,500
062C1502	Computational Steering and Modeling using Energy Systems Integration Facility Insight Center	$282,009
6501401	Extreme-Scale Flexible Downwind Wind Turbines	$248,296
6501501	Development of Feedforward Control Strategies for Wave Energy Conversion Technologies	$233,707
6501502	Improving the Accuracy of Lidar-Based Turbulence Measurements	$27,887

Project ID	Project Name	FY Total
6511301	Two-Component Signal Systems in Nitrogen Assimilation: Increasing Algal Lipid Productivities through Pathway Engineering	$20,555
6511401	Yeast Mitochondrial Pathway Engineering for the Production of 8-Hexadecene: A Drop-in Renewable Diesel Hydrocarbon	$285,288
6511501	Fatty Acid Decarboxylase Engineering for Continuous Hydrocarbon Fuel Production	$222,536
6511502	Adipic Acid as a Next-Generation Platform Chemical from Biomass	$232,833
6511503	Growth of Algae on Solid Supports for Enhanced Harvestability and Thermocatalytic Processing	$212,582
6511504	Biochemical Production of Bio-polymer Precursors	$663
6511505	Thermochemical Production of Bio-polymer Precursors	$112,934
6521303	Enhanced Photovoltaic Performance of Cu2ZnSnS4 Heterojunctions: An Interfacial Engineering Approach	$70,283
6521401	Epitaxial ZnSiP2/Si for Tandem Solar Cells	$278,378
6541501	Optimal Dispatch and Megawatt-Scale Power Hardware-in-the-Loop for Frequency Response Batteries	$304,869
6541502	Connected and Intelligent Urban Mobility	$462,643
6541503	Modeling of Dislocation Dynamics in Bonded Materials	$51,728
6551401	Hybrid Model-Based and Data-Driven Fault Detection and Diagnostics for Buildings	$275,103
6551501	Firming Net Zero Energy Buildings: Supervisory Control Development and Value Demonstration for Small Commercial Buildings	$257,340
6551502	Hardware-in-the-Loop Testing of Supermarket Demand Response Using Thermal Storage	$254,701
6551503	Urban Renewable Building and Neighborhood Optimization	$48,756
6551504	Reinventing Building Controls Design and Implementation	$52,270
6591202	New Concept for Hot Carrier Solar Cell	$65,906
6591301	Light-Stimulated Epitaxy of Amber Light-Emitting Diodes	$330,024
6591304	Heterometallic Polynuclear Clusters for Catalytic Water Oxidation	$208,124
6591306	Spectroscopy of Conduction Band States of Quantum Dots	$76,868
6591401	New Magnesium-Boride Anode Material for Next-Generation Mg-Air Batteries	$256,823
6591402	High Performance, Solid-State, Perovskite-based Solar Cells	$245,778
6591403	Next Generation Thermoelectric Materials for Direct Solar Power Conversion	$251,964
6591404	Precision Control of Semiconductor Interfacial Energetics to Enable Photo catalysis	$280,458
6591407	Enhance the capabilities of high-performance computer simulation to inform the design of materials for next-generation applications	$40,108
6591501	Crystallographic Feedback for Low-Defect Hybrid Organic/Inorganic Perovskite Films as Photovoltaic Absorbers	$263,079
6591502	Bipolar Membrane Fuel Cell Development	$209,961
6591503	Hybrid Energy Storage Systems	$48,336
065C1501	Cyber Physical Security and Resilience	$670,846
065D1403	Comparisons of Stochastic Modeling Applications at Multiple Operational Time Scales	$61,668
065D1404	Electricity Market Design for High Renewable Energy Futures	$142,798
065D1501	Renewable Power Plant Inertial Equivalency and its Service for Grid Stability	$213,926
065D1502	Optimal Inverter Dispatch: Facilitating High Photovoltaic Penetration with Optimization and Grid Informatics	$206,586
065D1503	An Advanced Methodology for Increasing Temporal Fidelity of Systems Emulated using Remote Power Hardware-in-the-loop	$204,498
065D1504	A Flexible Cyber-Physical Test Platform for Micro grids: Combining Hardware, Hardware-in-the-Loop and Network-Simulator-in-the-Loop	$223,366
065D1505	Development of Dynamic Distribution Management System: Coupling of Look-ahead State Estimation, Smart Inverter and Home Energy Management System	$317,125
065K1501	Rapid and Accurate Determination of Structural Phase Maps from Experimental Data	$232,933
065K1502	Developing Water-Hardened Perovskites	$50,630
065K1503	Wide-Bandgap Oxide Transistors	$43,618
065K1504	Excited-State Theory for Energy Materials	$38,234
6641401	A Framework for Comparison of Competing Spatiotemporal and Time Series Datasets	$113,919
6641402	Energy Services Test Bed Experiments: Humans-in-the-Loop	$902,513
6641403	Integrated Energy System Model	$698,194
066A1501	Modeling Electricity Sector Vulnerabilities Related to Water Temperatures	$126,905
066A1502	Demand-side Participation in Electricity Grid Integration Models	$267,671
066A1503	High-Performance Interactive System Dynamics Visualization	$55,219

Project ID	Project Name	FY Total
067A1501	Development of a Methodology for and Database of Region-specific Water Energy Intensity Factors	$51,101
Total # of Projects for NREL: 63	Total Cost for NREL: $11,808,306	
Total Administrative Cost: $213,523		
ORNL - Oak Ridge National Lab		
6361	Toward Scalable Algorithms for Kinetic Equations: A New Hybrid Approach to Capturing Multiscale Phenomena. Design and implementation of a hybrid method for the efficient solution of multiscale kinetic equations	$69,043
6362	Probing the Structure-Function Relationship of Protein Kinase A - Providing breakthrough advances in our understanding of the structure and dynamics of these fundamental biological systems by studying a prototypical signaling enzyme, protein k	$50,064
6380	A comprehensive theoretical/numerical tool for electron transport in mesoscale-heterostructures - Modeling electron transport in electronic devices using macroscopic equations	$48,510
6389	Advanced Mitigation of Ion Beam Space-Charge - Investigating the use of photo-emitted electrons to neutralize the space-charge forces of high-current, low-energy ion beams similar to those used in Electromagnet Isotope Separation	$46,986
6428	Structural Biology of Metabolic and Signaling Pathways in Plants	$49,999
6436	Developing Grazing Incident Small-Angle Neutron Scattering for Studying the Interplay between Amyloid-beta Peptide and Cholesterol in Lipid Bilayers	$34,921
6450	Stochastic parameterization of the influence of subgrid scale land heterogeneity on convection in a climate model.	$74,776
6469	New Measurement Technology for Physical and Biological Characterization of Fundamental Carbon Cycle Processes in the Subsurface Environment	$34,999
6481	Improved Metagenomic Analysis with Confidence Quantification for Biosurveillance of Novel and Man-made Threats	$72,042
6500	High-Flux Nanoporous Graphene Membranes for the Desalination of Water	$49,707
6509	Single-Crystal and Single-Crystal-Like Graphene in Large-Areas for Electronic and Energy Applications	$29,603
6521	Synthesis and Characterization of Novel Two-Dimensional Mesoscale Organic Nano membranes	$96,510
6552	Meso-scale Liquid Confinement Systems for Enhanced Bio separations and Bioconversion Strategies	$53,253
6558	Low-Cost, Multi-Sensor Wireless Platform for Smart Buildings	$46,167
6565	Towards a Resilient and Scalable Infrastructure for Big Data	$24,970
6735	Reducing Environmental Impacts of Hydro fracturing by Subsurface Co-Precipitation of Barium and Radium.	$130,342
6736	Pulsed Magnetic fields for Neutron Measurements	$154,876
6741	Exploration of Superconductivity in Non-layered Three-dimensional Materials for Potential High-field Magnet Applications	$254,583
6743	Computational Design of Soft Matter Materials	$18,677
6783	Application of Plenoptic Computational Photography to Improve Off-Axis Iris Recognition	$83,411
6789	Thermo-Mechanical Integrity of Critical Engineering Structures by High Spatial Resolution Neutron Diffraction	$298,313
6802	Predictive Soft Matter Materials Simulation - Developing an integrated computational effort to provide prediction and development of new/improved soft matter materials for energy science applications/technology with verification and feedback from experimental capabilities in precision synthesis and state-of-the-art characterization	$411,314
6810	Passive/Active Tools - Exploring the development of materials and structures to implement passive and active structures using graphene	$449,663
6813	New Paradigms in Passive Polymer Membranes for Carbon Dioxide Separation	$399,855
6814	Dynamic Neutron Imaging of Intra-nozzle Fluid Dynamics of Fuel Injectors	$486,084
6816	Toward the Development of an Integrated Energy-Water Risk Assessment Tool for Probable Maximum Precipitation and Flood	$349,532
6826	Direct catalytic conversion of methane to methanol	$309,918
6831	Mini-Apps: Building Laboratories for Portable Performance from the Petascale to the Exascale	$274,831
6837	Neutron Scattering Studies of Select Uranium Compounds	$350,960

Project ID	Project Name	FY Total
	United States Department of Energy **Laboratory, Plant or Site Directed Research and Development Report** **Project List -- Fiscal Year 2015**	
6840	Pattern Discovery and Predictive Modeling on Heterogeneous Graphs using Cray&aposs uRiKA	$469,302
6847	Infrared computer tomography spectroscopy for long-term characterization of large scale greenhouse gas emissions	$348,972
6858	Mobile Device Security - Classified project	$380,622
6863	Residual Stress Modeling and Neutron Characterization of Additive Manufactured Components	$397,989
6874	Large Scale Hydraulic Fracture Simulation	$341,135
6877	Situation Awareness in Complex Networks	$362,600
6895	Sustainable Energy through Complex Oxide Materials: Multivalent Oxygen Sponges for Efficient, Low Temperature Catalysts	$392,227
6898	Provably Secure Time Stamp Distribution for the Electric Grid	$408,743
6901	Laser based diagnostics for characterizing materials exposed to a plasma environment.	$332,562
6907	Heteroepitaxial Diamond Films for Next Generation Power Electronics	$159,221
6917	Computational National Healthcare Model for Value-Based-Purchasing Cost Projections on large-scale high-fidelity model for the constituent actors in the US healthcare eco-system	$414,538
6923	Complementary Silicon Carbide Wide Band Gap Integrated Circuits for Bidirectional Electric Vehicle Chargers	$318,565
6928	Next Generation Compact and Reliable WBG-Based Inverter Breakthrough with Additive Manufacturing and High Performance Computing	$339,861
6932	Accelerated Discovery and Design of Complex Materials	$267,491
6944	Transformative Process for Coupling Solar Energy to Biofuel Production in Yeast for Steady State Bioconversion Reactors	$309,855
6945	Nano cellulose reinforced polymers for additively manufactured structural composites	$329,740
6984	A genome-enabled approach for predicting plant functional traits in dynamic vegetation models	$333,539
6987	Preparing OpenACC for Exascale - OpenACC is a directive-based language extension for Fortran, C, and C++, that facilitates the simple and effective use of accelerators (e.g., GPUs) without sacrificing portability for non-accelerator systems	$397,374
6988	Revealing the structural organization of membranes in living cells by small-angle neutron scattering	$336,086
7004	Untangling the role of boundaries, defects, and interfaces in two-dimensional inorganic materials: a combined theoretical and experimental approach	$388,449
7019	Rational Design of Novel Porous Polymeric Organic Framework Materials	$350,247
7022	An Advanced Materials Irradiation Facility to Promote Innovative Materials Research at the High-Flux Isotope Reactor	$423,991
7033	Design and demonstration of a Material-Plasma Exposure target station for neutron irradiated samples	$324,464
7036	Transformational Capability for Integrated Analysis of Irradiation Experiments and Isotope Production Using High-Fidelity Modeling and Simulation	$404,871
7042	Algorithm Resilience with Respect to Hardware Error - The objective is to extend the current framework of numerical analysis by removing the assumption that all arithmetic operations can be computed accurately within machine precision	$19,741
7048	Development of ultrasensitive analytical techniques for the MAJORANA 1-ton experiment.	$450,875
7065	Epitaxial Oxide - Intermetallic Alloy Heterostructures - Investigating the magnetoelectric coupling at well-controlled interfaces between multiferroic oxides and intermetallic alloys	$147,362
7069	The role of surface oxygen vacancies in perovskite oxide catalysis	$76,188
7073	New protocols for user authentication and key distribution for Smart Grid applications using Physical Unclonable Functions	$99,070
7085	Scalable Malware Repository (Pico) and Analysis Platform (Concordia)	$44,891
7088	Mechanical Testing and Characterization of Irradiated Concrete Structures for Light Water Reactor Life Extension Analysis	$71,937
7104	Universal Circuit Optimizer for Quantum Information and Metrology Applications based on Linear Optics	$31,000
7105	Large Time Scale Atomistic Modeling of Metallic Glasses Deformation - Predicting the metallic glasses (MGs) deformation over large time scales, from nano-seconds to years, by means of state-of-art atomistic modeling methods. This is a formidable challenge in both scientific concepts and practical simulation	$181,320
7115	First principles study of the influence of disordered dopants on the electronic structure of functional materials	$225,622

	United States Department of Energy	
	Laboratory, Plant or Site Directed Research and Development Report	
	Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
7149	Production of renewable hydrocarbon fuels from Saccharomyces cerevisiae	$33,760
7150	Revealing the Functionality of Nanomaterials for Energy Applications at the Atomic Scale	$51,806
7160	Quantum Plasmonic Memory - Enabling new discoveries ranging from sub-diffraction-limited plasmonic quantum information processing and quantum enhanced plasmonic nano-imaging to quantum technologies enabled by ultra-strong plasmonic interactions	$13,941
7164	Magnetically controlled crystallization of biological macromolecules - Investigating the impact of static and gradient magnetic fields on the success rate of commercially available formulations for crystallization screening by evaluating	$48,929
7177	Selectively Probing Femtosecond Excited State Dynamics at the Surface of Semiconductor Nanowires using Time-Resolved Sum Frequency Generation	$194,245
7184	Neutrino Physics at Oak Ridge National Lab: Neutrinoless Double-Beta Decay, Direct Mass Measurements, & Neutrino Measurements at Spallation Neutron Source	$190,571
7199	Background Studies for an Oak Ridge National Lab Neutrino Program	$74,665
7215	Additive Manufacturing of Advanced Ceramic Components	$34,949
7223	Unconventional Magnetism and Superconductivity in Non-centrosymmetric CeTX3 (X = Ge,Si) Studied by Neutron Scattering	$197,731
7224	Novel Low Temperature Aluminum Recycling and Purification Methodology	$9,693
7225	Cell free production of complex chemicals	$62,383
7227	Structure-Function Studies of Nucleic Acids Using Neutron Crystallography Enabled by Selenium Modification	$93,882
7238	Fundamental Understanding of Banded Structure Formation during Laser Additive Manufacturing of a Titanium Alloy using Massively Parallel Phase Field Simulations	$51,373
7244	High Yield Process For Lignin-Based Activated Carbon Fibers - Demonstrating a high yield, faster method for the production of low-cost activated carbon fibers (ACF) from Lignin, a renewable precursor	$129,394
7250	Fibrillated Carbon Precursor Materials for Use as Composite Preforms	$39,947
7257	Development of a New Lattice Physics Methodology for Doubly Heterogeneous Particulate Fuels	$125,087
7262	Adaptive Ader Time Stepping Schemes for Efficient, Parallel Scientific Simulations	$84,947
7271	Atomistic response of the MAX phases to irradiation - Determining the suitability for possible application in next-generation fission and fusion energy systems of a special class of materials	$89,504
7278	Enabling Biophysical Characterizations - Investigating an intrinsically disordered protein , implicated in acute myeloid/lymphatic leukemia , nuclear co-activator binding domain , which has the propensity to adopt extended conformations in unbound form and undergoes synergistic folding with substrate specific conformations when bound	$179,444
7280	Demonstrating a Novel Bio-defense Capability using Public Health Data Informatics	$165,660
7281	DNA2Face: Predicting Faces from a DNA Sample	$169,549
7285	Chemical and Radiation Induced Volumetric Expansion of Minerals Composite in Interaction with Cement-like Materials	$245,417
7286	Next Generation Studies of Quark-Gluon Matter with High Luminosity Pb-Pb Collisions at the CERN Large Hadron Collider	$244,615
7294	Couette Columns: Multi-stage Separation Devices for Use in Isotope Separations	$120,223
7299	Modeling and Analysis of Gapless Ferromagnetic Core Inductors	$72,891
7305	Membrane Domain Formation on Nanostructured Scaffolds - Understanding the lateral structure of membranes and how it relates to function is critical to advancing biological science and technology	$189,878
7312	Novel Mathematical and Computational Paradigm for Nonlinear Filtering Problems (This is a Householder Fellowship)	$124,865
7315	Developing hydroxide fuel cells based on novel polymers with improved stability and higher ionic conductivity	$169,325
7319	Quantum key distribution in conventional optical fiber networks using untrusted devices	$389,846
7325	Optimizing High Flux Isotope Reactor Isotope Production Through the Investigation of a Sensitivity-Informed Target Design Process Using High-Fidelity Modeling and Simulation Capabilities	$472,553
7329	National Extreme Events Data and Research Center - Transforming the national capability for resilience to extreme weather and climate events	$346,045

	United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
7331	Development of a wide-angle neutron velocity selector for the neutrons scattered at the sample position at inverted geometry spectrometers	$481,046
7332	Transformational Integrated Fusion Neutronics Modeling and Simulation	$385,128
7339	Application Data Structure Layout and Access Pattern Port Planning for Exascale Memory Architectures	$450,948
7340	Transportation Security: Trustworthy Vehicle Computing System	$380,595
7345	Transformational Fabrication Technologies for Nuclear Applications: Demonstration of Hybrid Structures for HFIR Control Plates	$377,034
7347	CloneX: Discrete Event Cloning at Exascale	$350,496
7351	Theory of neutron scattering in strongly correlated and disordered materials - Developing a new theoretical capability to simulate magnetic neutron scattering experiments for a class of systems known as strongly correlated electron materials, which offer particularly exciting prospects for applications due to their complex emergent behavior and exotic physical properties	$349,209
7362	Spatially Resolving Electron Spin Dynamics and Transport in Low-Dimensional Materials: A Spin-Dependent, Real-Space, Multi-Scale, Scanning Probes Approach	$349,002
7365	A high performance, data-driven simulator of the American population for modeling urban dynamics.	$323,940
7374	Development of novel neutron spin-echo methods for ultra-high resolution spectroscopy at ORNL	$371,012
7393	Quantum-enhanced plasmonic ultra-trace sensors - Based on extraordinary optical transmission measure small changes in the optical transmission through nanohole arrays when a substance binds to probe molecules on the surface	$380,638
7394	Functional domains in model membranes and protocells probed with high-performance simulation and neutron scattering	$453,370
7395	Workflow Optimization and Processing of Complex Datasets for Off-site Fusion Energy Research	$384,196
7396	Scalable Data and Informatics for Connected Vehicles Leveraged to Enhance Efficiency	$369,748
7398	Nonlinear Nano photonics with Ultra strong Plasmonic Coupling	$399,830
7399	Fine-resolution Modeling of Urban-Energy Systems & apos Water Footprint in River Networks	$341,252
7406	High Resolution Solid State Neutron Detectors for Second Target Station	$468,728
7409	In Situ Multi-scale Visual Analytics for Transformative Extreme Scale Science	$350,017
7412	Predicting Climate Feedbacks - Tropical	$328,304
7417	Algorithms for Context-Specific Analysis of Heterogeneous Unstructured Big Health Data	$399,947
7420	Phase Change Material Detectors for Single Photon Detection in the UV-Vis Region	$344,909
7427	Predictive computational catalysis: From electrons to reactors	$498,511
7428	Increasing advanced biofuels production from terpenes in Eucalyptus leaves	$316,225
7443	Interrogating monolignol transport using a multimodal imaging approach	$259,227
7445	Layered Ferroics by Design - This project will lay the ground-work for van-der-Waals crystals of ferroic dielectrics - with specific focus on "ferroelectric graphite" that exhibits synchronized atomic displacements and macroscopic electrostatic polarization	$421,803
7448	An Integrated Approach to the Design and Discovery of Fast Ionic Conducting Materials	$487,048
7451	Integrated Framework for Urban Climate Adaptation Tool - Through collaboration with the City of Knoxville and using water as the lifeline sector of interest, we propose to develop an integrated framework that enables urban governments to: (1) understand climate change impacts on water-related functions; (2) identify and prioritize adaption options (e.g., green infrastructure emplacement) for minimizing the projected impacts; and (3) explore potential benefits and/or limitations of the adaptation options under different scenarios related to urban growth	$344,332
7457	Off-grid Building Management System - create an interoperable and flexible off-grid building management system that reliably and cost-effectively integrates energy generation, storage, and end-use components to facilitate off-grid building(s)	$1,380,336
7465	Volume-Moderator Demonstration Facility - Leveraging the soon-to-be operational Integrated Test Stand Facility at the Spallation Neutron Source to provide a moderator neutronics test capability with which we will verify the anticipated performance gains expected and required from the innovative moderator concepts central to the SNS Second Target Station	$539,379
7475	Extreme Scale Analytics for Near Real-Time Information Extraction in Multimodal Data	$381,480
7476	Structure and Function of Oxides	$395,608
7499	L Garrison Weinberg Fellowship	$73,636

	United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015	
Project ID	**Project Name**	**FY Total**
7509	Advanced Atom Probe Technology	$316,764
7510	Large-Scale Cluster State Generation for Fault Tolerant Quantum Computation	$80,010
7531	Filamentous fungi for biodiesel production using lignocellulosic residuals	$155,164
7535	Investigation of the Potential of Water Injection to Control Low Temperature Combustion	$192,571
7536	Two-Dimensional Transition Metal Based Electrode Materials for Lithium-ion Batteries	$184,608
7541	Advanced Calibration Development for Inverse Heat Conduction: Exploiting High Thermal Conductivity Nanomaterials and Integrated Thermocouple Technologies	$69,939
7542	Multi-Scale Model for Plant-Soil Hydraulic Coupling at the Water Shed Scale	$199,968
7549	Detection of Explosives Materials Underwater	$156,068
7555	Enhanced ferroelectric response near the morphotropic phase-boundary in lead-free TiO3-BaTiO3 investigated with neutron scattering and piezo-force microscopy	$55,785
7568	Mission-Critical Heavy Element Separations using Electrolysis and Superionic Conduction	$126,842
7570	Characterization of inulinase-expressing Saccharomyces cerevisiae strains for the consolidated bioprocessing of Agave feedstocks	$189,879
7581	Towards understanding He-ion induced tungsten nano-fuzz formation under extreme fusion reactor conditions - This interdivisional proposal (Physics, MSTD) focuses on an examination, under well characterized ultra-high-vacuum laboratory conditions, of the conditions leading to the growth of nano-fuzz on hot tungsten surfaces induced by high-flux and fluence He-ion irradiation	$211,998
7607	Protein Segmental Labeling For Contrast Variation in Small Angle Neutron Scattering Studies	$23,944
7608	Improving Performance and Efficiency of Centrifugal Contactors by Employing Electrodispersion	$160,158
7618	Genomics, computing, and neutron scattering to probe host-microbe interface for environmental assessment of clean energy	$250,520
7620	Synthesis of Novel Semiconductors through High Pressure Indentation	$55,381
7621	Cavity Design for the Coherent Combination of Weakly-Coupled Large Diode Laser Arrays in the Presence of Noise	$29,987
7623	Crystal Growth of Lanthanide-Halide Metal Organic Scintillators for Applications in Radiation Detection	$203,420
7630	Training Deep Belief Networks with Quantum Computing - This effort builds on insights into the theory of deep belief networks, namely, restricted Boltzmann machines, and their correspondence with an Ising spin system	$29,433
7631	Development and Investigation of Advanced Monte Carlo Fission Source Convergence Acceleration Methodologies	$90,003
7635	Leveraging high-throughput sequencing and genetic mapping to determine genetic loci and genetic networks underlying genome-wide transcript variation in Populus	$100,598
7637	Spectroscopy of quantum matter under extreme pressures	$895,413
7640	Dynamically Polarized Crystallography for Spectroscopy - The development of a Dynamically Polarized Crystallography instrument will deliver a >1000-fold gain in performance for diffraction analysis of hydrogenous materials and enable breakthroughs in our understanding and control of complex biological systems	$1,190,824
7641	High-Resolution Small/Wide Angle Neutron Scattering for Atomic-to-Mesoscale Structure in Complex Soft Materials and Biology	$471,478
7651	Structural Health Monitoring of Compression Connectors in Overhead Transmission Lines Using a Smart Patch	$144,285
7656	Radioactive Particle Levitator to Study the Effects of Radioactivity on the Particle Charging Behavior	$80,919
7658	Targeted Metagenomic Analysis of the Novel Bacterial Phylum AD3 from Walker Branch Watershed Shallow Subsurface Soils	$29,997
7669	Multimodal Imaging of Belowground Plant Root Distribution and Dynamics - Investigating an imaging technique that relies on the insertion of an imaging system into the ground by means of a transparent tube combined with multispectral illumination to capture multiple panoramic images longitudinally to the tube	$59,458
7670	Experimental and Computational Evaluation of Optical Materials for Instrumentation in Extremely High Temperature Irradiation Environments	$72,789
7676	Linking Structure with Function at the Mesoscale in Complex Oxides Materials.	$226,607
7677	Developing Big Data Analytics for Human Settlement Characterization and Energy Demand Prediction	$191,040
7685	Simulation and algorithm development for 3D residual stress measurements with energy dependent neutrons	$99,121

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
7695	Detection of Ionizing Radiation via Stimulated Emission	$44,064
7701	High-efficiency passive solar concentrator based on poly(N-isopropyl acrylamide) phase change - Demonstrating the technical feasibility of a passive (non-tracking) sunlight collector and concentrator design that employs a thermally activated nanomaterial to couple light into a waveguide and deliver concentrated sunlight to the surface of a photovoltaic cell	$158,781
7703	Fast Evaluation of Collision Operators for Modeling Non-Equilibrium Transport - Exploratory project aimed at the fast evaluation of integral operators that are used to model the microscopic interactions of particles with each other and/or their physical environment	$102,202
7704	Multiscale Investigation of Gas Behavior in Structural Materials in Fusion Energy Environment: A Combined Experimental and Modeling Approach	$205,132
7707	Synthetic Control of Hybrid Nanomaterials for Energy Applications	$122,119
7728	New design criteria for large area, low power radiation detection systems based on Silicon Photomultipliers	$42,689
7729	A plasma source for transient heat load investigations - Focuses on the characterization and feasibility of implementing a pulsed electrothermal (ET) plasma source for the simulation of transient heat loads in future fusion reactors	$72,208
7732	Production of Renewable Chemical Building Blocks via Electro-Fermentation	$89,360
7735	Chemical Reactivity of Solids: Chemical Dynamics of the Atomic Structure of Solids Using Time-of-Flight Neutron Total Scattering	$106,033
7739	Computation Cluster for Spallation Neutron Source Second Target Station Development	$627,685
7745	Irradiation effect on thermoelectric materials	$23,741
7747	Colloquium: A Tool For Modeling Hybrid Quantum Computing & High Performance Computing Potential	$80,129
7748	Implementation of a Radio Frequency and Electro-Optical/Infrared Simulation Testbed to Optimize Radio Frequency and Sensor Design for Kill Assessment and Warhead Typing	$29,984
7757	Quantum Communications Networks, Scaling Laws and Resource Requirements	$101,668
7758	Correlotypes: Determining complex genotypic profiles responsible for complex phenotypes	$199,617
7759	Highly Permeable Graphene Oxide Membranes for Water Vapor Separation	$29,217
7760	Develop an Eddy Covariance Capable Optical Oxygen Sensor	$115,573
7762	Automated Extractor Generation for Packed Malware	$93,092
7763	Individual diploid genome sequencing with parental haploid resolution and structural variation identification	$15,269
7767	Berry phase imaging development: a novel modality for back-reflectance imaging of scattering samples	$112,917
7771	Concurrent multiscale algorithms for local/nonlocal coupling and its adaptivity - Developing novel multiscale algorithms for concurrent coupling of local and nonlocal continuum models and its adaptivity	$127,889
7776	Magnetoelectric multiferroic nanocomposites-going beyond complex oxide perovskites	$196,436
7844	Persistent, Proportional, Prompt, Precision Strike - The concept links and drastically magnifies the usefulness of major existing components that have been recently developed such as low observable unmanned aerial vehicles coupled with global positioning system guided mortars	$29,390
8005	Overcoming Antibiotic Resistance: Neutron crystallographic and quantum chemical studies of a beta lactamase enzyme	$9,713
8013	Ion decoupling in layered electrolytes of boron nitride and ionically assembled polyethylene oxide-Li+ complexes	$5,233
8018	From Spins to Stars: Informing Explosive Astrophysical Scenarios through Indirect Measurements on Radioactive Nuclei	$82,507
8025	Power Measurement Framework for Cyber Defense - Improving detection techniques	$16,976
8033	Evolution of solvent production in competitive microbial communities	$26,976
8043	Experimentally driven deep data in Helium Ion Microscopy - Bridging nanofabrication and imaging across a broad range of disciplines	$32,478
Total # of Projects for ORNL: 187 **Total Cost for ORNL:** $41,432,460		
Total Administrative Cost: $175,251		

PNNL - Pacific Northwest National Lab

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
PN12005/2406	Optofluidics and Microfluidics for Exploring Biofuel Production at the Single Cell and Molecule Levels	$27,506
PN12012/2413	Bazooka Single-Photon Emission Computerized Tomography Neutron Imager	$185,963
PN12059/2460	Numerically Robust Climate Simulation Through Improved Interaction between Model Components	$64,237
PN13004/2485	Directed Mesoscale Synthesis of Tunnel Structured Materials for Energy Applications	$201,530
PN13005/2486	Novel Alloy Nanoparticle Materials for Catalysis and Energy Storage	$212,324
PN13006/2487	Novel CO2-Selective Polymer/Double Salt Composite Membranes for Continuous CO2 Removal from Warm Syngas	$100,032
PN13007/2488	Developing A Next Generation Biogeochemical Module for Earth System Models	$195,043
PN13008/2489	Resolving the Reactor Neutrino Anomaly by Precision Beta Spectrometry	$195,907
PN13009/2490	Structure and Dynamics of Biological Systems	$406,093
PN13010/2491	Probing Structure-Property Relationship of Energy Storage Materials Using Ex Situ and In Situ Dynamic Microscopy and Spectroscopy with High Spatial and Fast Temporal Resolution	$290,641
PN13013/2494	Improving the Performance of Li-Air and Li-S Batteries Using Polymeric and Metallic Nanomaterials	$281,283
PN13015/2496	Atomic Mass Separation for Enhanced Radiation Detection Measurements	$529,791
PN13016/2497	GridOPTICS - The primary aims of the project are to provide a flexible, scalable software architecture for integrating a range of data collection, analysis, simulation and visualization technologies that are needed to support the operations and planning of the future power grid.	$238,684
PN13018/2499	Enhanced Sediment Geochronology Achieved Using Ultra-Low Background Materials and Ultra-Sensitive Detection Capability	$323,641
PN13019/2500	Alpha Coincidence Techniques for Actinide Assay - This project will develop and demonstrate a new concept for radiometric assay system capable of measuring actinides that using coincidence detection methods to increase specificity of the measurement to remove interferences.	$59,454
PN13020/2501	Analytic Framework: Signature Discovery Workbench - A primary challenge in signature discovery development is supporting users in design and evaluation of usable workflows that detect, develop and measure features and signatures across disparate data sources and domains. The Signature Discovery Workbench will leverage the User Centered Design Methodology to create a client facing application for generating signature discovery workflows.	$69,972
PN13027/2508	Anthropogenic Uranium Detection with X-ray Microscopy	$197,251
PN13029/2510	Market Design Analysis Tool - Power market design plays a critical role in the outcomes related to power system reliability and market efficiency. Because of algorithmic and computational challenges for realistic power market simulations, the design of power market has been based on simplistic assumptions of energy supply and demand. This project developed a market design interpreter and a market design optimizor, which translates the market design specifications into computer codes. The simulator then works to find the optimal market design to achieve system goals	$227,986
PN13030/2511	Fishing for Features: Discovering Signatures when the Underlying Phenomenon is Poorly Understood	$126,560
PN13032/2513	Mössbauer Spectral Imaging - The goal of this project is to develop a Mössbauer spectrometer capable of chemical characterization of actinide containing materials, isotope ratio quantification and location of actinide containing particles on a cotton swipe or similar matrix	$265,972
PN13033/2514	Developing Next-Generation Multimodal Chemical Imaging Capability	$266,681
PN13035/2516	Simultaneous Electrochemical and Nuclear Magnetic Resonance Techniques for the Study of Electrochemically Active Biofilms	$257,111
PN13037/2518	M&Ms4Graphs: A Multi-scale, Multi-Dimensional Graph Analytics Framework for Cyber Security	$270,696
PN13039/2520	Kritikos: Identifying Cyber Assets and Assessing Criticality in Terms of Business Processes	$220,619

Project ID	Project Name	FY Total
PN13051/2532	Cyber Security Testbed and Dataset Generation - Workable datasets and metrics are highly sought after by scientists in the field of cyber security, and are necessary to enable research experiments to test, validate, and answer scientific hypotheses surrounding methods to detect, prevent, deter, and respond to cyber threats, vulnerabilities, and exploitation. This project will create a highly dynamic cyber security test bed that will allow users to create systems and networks representative of actual systems and networks on which to perform research	$681,964
PN13057/2538	Scire: Scientific Process for Validation and Verification - This project will develop scientific methods for executing and evaluating cyber security research. The aim of this project is to develop and exercise a methodology for verification and validation when performing modeling and simulation, experimentation and studies, and theoretical research	$138,301
PN13061/2542	Meso-scale Science and Technology: Manufacturing of Nanostructured Soft Magnetic Materials	$405,030
PN13063/2544	Theory of Resilience - This project will lay the groundwork for a formal framework for resilience of compromised cyber-systems. Specific outcomes include theoretical framework and concepts for robust design and reconstitution of compromised cyber-systems	$69,665
PN13067/2548	Imaging and Monitoring the Initial Stages of Biofilm Formation	$204,606
PN13070/2551	Bio-Inspired Actinides Recognition for Separation Science	$40,418
PN13072/2553	Improving Magnetoelectric Coupling in Novel Single-phase Multiferroic Thin Films of the MTiO3(M = Fe, Mn, Ni,...)Family	$102,157
PN13073/2554	Measuring and Modeling the Climatic Effects of Brown Carbon Atmospheric Aerosols: Developing an Integrated Capability	$111,044
PN13081/2562	Advanced Visual Analytic for the Power Grid	$344,026
PN13091/2572	Operations and Planning Fusion	$267,215
PN13092/2573	Localized Surface Plasmon Resonance Spectroscopy, Microscopy, and Sensing	$297,330
PN13098/2579	Tin Project - This project will develop ultra-sensitive measurement capability to target specific environmental radioisotopes	$674,873
PN13100/2581	Optical properties modification in complex oxide epitaxial films via alloy formation	$311,709
PN13101/2582	Exploring and Engineering Phototrophic-Heterotrophic Partnerships	$276,371
PN13102/2583	Signatures of Environmental Perturbation - Microbial Community and Organic Matter Resilience	$400,505
PN14001/2585	Low Background Liquid Scinitillation Counter	$615,826
PN14003/2587	Ultra-low Background Polymers for Structural Applications in Radiation Detectors	$985,531
PN14006/2590	Dark Matter Physics - The nature of the dark matter that makes up 85% of the matter in the universe is unknown. This project focuses on analysis of current data and future experiments to address this scientific priority in the field of cosmology and particle physics	$210,476
PN14007/2591	Determining Groundwater Residence Time through Ultra-Low Measurements of 39Ar and other Radiotracers	$511,079
PN14008/2592	Biomass-Derived Acrylonitrile for Carbon Fiber Production	$69,864
PN14009/2593	Family of Resilience Metrics for Cyber Security Operations	$216,063
PN14011/2595	Characterization of Anonymous Peer-to-Peer Networks	$202,483
PN14012/2596	High Information Content Polymers and their Assembly into Structural Motifs	$445,115
PN14013/2597	Free Form Millimeter-Wave Imaging	$176,492
PN14014/2598	Technologies for Non-intrusive, Unattended Measurement of UF6 Gas Flow	$179,219
PN14015/2599	Analytics Integration and Validation Framework - The goal of this project is to enable the integration of multidisciplinary research efforts and their products into a unified framework for the discovery and validation of complex signatures	$299,948
PN14016/2600	Signatures of Communities and Change - This research aims to identify and validate a novel set of computationally tractable signatures for social media data that signal the presence of significant community events such as dissolution, schism, conflict periods, and ideological change	$81,584
PN14017/2601	Membrane reactor-enabled manufacturing processes of nano-metal part	$157,985
PN14018/2602	Predictive Understanding of Self-Assembly: Particle-Mediated Growth	$435,613
PN14019/2603	High Aspect Ratio Functional Composites for Thermal Optical Applications	$200,465
PN14021/2605	Scalable High-Level Programming - The outcome of this project will be to create a baseline programming language that will provide a basis for ongoing research suitable for analysts and domain scientists across a range of missions for DOE. It will provide a unique capability for addressing "big data" problems	$721
PN14022/2606	Platform for Large-Scale Determination of Protein-Ligand Binding	$178,980

	United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
PN14023/2607	Combined microscale 13C and 18O measurements at cutting-edge sensitivities and spatial resolution	$214,773
PN14024/2608	Leveraging Power Grid Contingency Analysis Techniques For More Resilient Cyber Networks	$151,940
PN14025/2609	Fundamental mechanisms of nucleation and growth of particles in solution	$452,240
PN14026/2610	Robust Hierarchical Zeolite Frameworks - The goal of the study is to provide a molecular description on the formation and arrangement processes during synthesis of microporous crystalline silicates and use that knowledge as basis for the synthesis of nano-sized and mesoscopically structured zeolites with tailored chemical and textural properties	$390,275
PN14027/2611	Multi-scale processes controlling spatial variation in greenhouse gas emissions in a subarctic watershed	$191,231
PN14029/2613	Signatures of Illicit Nuclear trafficking for Strategic goods	$279,234
PN14030/2614	Global Forensic Chemical Exposure Assessment for the Environmental Exposome	$198,645
PN14031/2615	Signatures of Underground Explosions	$36,893
PN14033/2617	Low Background Light Sensitive Photo-Diode Array for Scintillator Readout	$273,087
PN14034/2618	Network Chimera - Cyber systems are a collection of aspects most often connected in unplanned ways. This project investigated the impact of temporal diversity on resiliency for cyber systems	$26,204
PN14035/2619	Rapid Viability Assays for Biothreat Event Characterization	$240,858
PN14039/2623	Regional-Scale Measurement and Modeling of Biogenic Organic Fluxes: Bridging the Gap Between Process Studies and Climate Models	$268,106
PN14040/2624	Aggregate Load Modeling and Control for Power Grid Regulation Services	$203,031
PN14041/2625	Complex Systems Control Testbed	$230,034
PN14042/2626	Distributed Control of Large-Scale Complex Systems	$203,017
PN14044/2628	Agent-Based Testbed for Complex Building Control Systems	$229,313
PN14045/2629	Decision Theory for Incentive Compatible Mechanism Design	$197,654
PN14046/2630	High-Level Modeling Specification for Simulation of Control Systems	$112,523
PN14047/2631	Impacts of Communication Network on Distributed Control	$191,868
PN14050/2634	Graphene Oxide Based Structured Laminar Membranes	$430,474
PN14057/2641	Nanocomposite Particle Synthesis Using Switchable Ionic Liquids	$271,262
PN14058/2642	Hybrid Microchip/Capillary Electrophoresis Platform for Rapid, Ultrasensitive Bioanalysis	$49,669
PN14061/2645	Marine Radiochemistry: First Th-231 Measurements in Seawater for Tracing Rapid Particle Dynamics	$238,592
PN14063/2647	Online Predictive Analytics on Streaming Data	$362,795
PN14064/2648	Science of Interaction: Towards Human-Machine Co-Reasoning	$381,080
PN14065/2649	Shyre: Streaming Hypothesis Reasoning - Testing a hypothesis involves significant investigative effort. This project focused on the query of what happens when hypothesis testing is automated to occur automatically as new information becomes known	$426,607
PN14066/2650	Development of a Novel Microscopy Platform for Fundamental Studies of Ice Nucleation on Atmospheric Particles.	$163,194
PN14067/2651	Bridging length scales in complex oxides: From point defects to defect superstructures	$263,257
PN14068/2652	Simultaneous 14C and T Dating of environmental organic matter	$391,424
PN14074/2658	Creating a Gas Phase Chemistry Workbench by Performing Manipulations in Efficient Ion Traps	$100,266
PN14075/2659	Vapor Detection of Illicit Substances in an Atmospheric Flow Tube Mass Spectrometer	$75,132
PN14076/2660	Streaming Data Characterization - The goal of this project is to create a library of existing, relevant algorithms and methods in streaming data analysis and enable them to be used in multiple domains and approaches for hypothesis generation	$52,444
PN14077/2661	Development of an Ultra-small Volume Detection and Sample Delivery System for Exploring Microscale Heterogeneity with Nuclear Magnetic Resonance	$60,951
PN14079/2663	Single-Step 2-D Ion Mobility Separations Technology	$99,909
PN14081/2665	Rhizosphere Underground: Unraveling the Role of Microbes in Stabilizing Carbon Pools in Soils	$132,221
PN14082/2666	Quantifying Carbon Fluxes and Underlying Mechanisms Using Multiple Data Sets with a Joint Land-atmosphere Ensemble Kalman Filter Data Assimilation System	$247,136
PN14083/2667	Developing Signatures that Relate Fecal Microbiome Characteristics with Gastric Bypass Surgery Outcomes	$154,180
PN14084/2668	Identifying Cloud Phase States from Multiple Remote Sensing Observations	$75,030
PN14085/2669	Drugs of Abuse Retention and Degradation in Environmental Biofilms	$79,987
PN14086/2670	Topological Analysis of Graphs in Cyber Security	$369,790
PN14087/2671	Dorci - The Defenders Role in Resilient Cyber Security	$149,355
PN14088/2672	Cyber Risk Assessment Model	$6,940

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
PN14089/2673	Multiscale modeling and uncertainty quantification for complex non-linear systems	$328,384
PN14090/2674	Optically Resonant Subwavelength films for Tags and Seals	$151,838
PN14091/2675	Extreme Ultraviolet Lithography Laser Ionization Mass Spectroscopy	$146,492
PN15001/2676	Experimental Management for Controls of Complex Systems Test Bed	$208,463
PN15002/2677	Scalable Hierarchical Validation & Calibration for Robust Distributed Control of Large-scale Complex Systems under Uncertain	$162,269
PN15003/2678	Visual Analytics Platform for Large-Scale Hierarchical Control System Data	$189,717
PN15004/2679	Development of hierarchical porous structured materials for energy storage applications	$317,200
PN15005/2680	Integration and Demonstration of Scalable Power System Simulation for Carbon Capture Simulation Initiative Test Bed	$143,409
PN15006/2681	Integration and Demonstration of Co-simulation Platform in the Carbon Capture Simulation Initiative Test bed	$90,730
PN15007/2682	Resilience in Large-Scale Distributed Control Systems	$253,658
PN15008/2683	Scale-up of new chemistry batteries for transportation and stationary applications; material synthesis and pouch cell development	$120,780
PN15009/2684	Co-Simulation Platform for Rapid Prototyping of Control Algorithms	$189,473
PN15010/2685	Cultivation-independent untangling of microbial gene regulation networks	$199,691
PN15011/2686	Compression Statistics for Analysis of Streaming Data	$224,037
PN15012/2687	Laser-ablation based multimodal tool for nuclear forensics	$192,349
PN15013/2688	Observing and Quantification of the Initial Stages of Nucleation and Growth in Liquids	$411,143
PN15014/2689	Sub-Surface Catalytic Conversion of Oil Shale Kerogen into Shale Oil for Enhanced Oil Recovery	$109,429
PN15015/2690	Bio-inspired Selective Conversion of Methane to Methanol	$199,950
PN15016/2691	Impact of Environmental Stressors on Complex Biological Systems	$307,048
PN15017/2692	Digital Currency Graph Forensics to Detect Proliferation Finance Patterns	$158,569
PN15018/2693	Sequence-Defined Polymers based on a New Backbone Architecture	$280,402
PN15019/2694	Detection of Production at the Source - Research reactors are often the first technology that a nation intent on producing unauthorized plutonium will procure. Larger research reactors can produce a significant quantity a year if properly configured. This research will determine if such a reconfiguration will produce revealing transient operating signatures	$135,266
PN15020/2695	Scalable Synthesis of Spinel Stabilized Metal Catalysts	$252,360
PN15021/2696	A Population Based Approach for Hypothesis Generation and Control	$172,545
PN15022/2697	Cognitive Depletion in Streaming Environments	$309,641
PN15023/2698	NOUS: Incremental Maintenance of Knowledge Graphs - Knowledge graph construction and maintenance is an expensive process involving manual curation by domain experts. This project is working to construct knowledge bases that are evolving over time and can be useful for creating and validating hypotheses	$426,719
PN15024/2699	Scalable Feature Extraction and Sampling for Streaming Data Analysis	$290,998
PN15025/2700	User-centric hypothesis definition - This research aims to reveal effective techniques for visual communication of machine learning output to non-expert users in a streaming environment	$309,262
PN15026/2701	Development of integrated modeling framework to quantify strong interdependencies and vulnerabilities between water and energy in the Western interconnection	$251,614
PN15027/2702	Solving the Plutonium-238 Problem	$714,494
PN15028/2703	Atomistic view of solid-liquid interfaces using in-situ X-ray Probes	$564,904
PN15029/2704	High Resolution and 3D Imaging of Nanomaterials	$204,055
PN15030/2705	Discovering Coherent Elastic Neurtino Nucleus Scattering in MiniCLEAN (Dark Matter Experiment) at Fermilab	$188,374
PN15031/2706	Rendezvous: Optimization and Stochastic Algorithms for Asymmetric Resilient Infrastructure	$250,104
PN15032/2707	Increasing annual biomass productivity through development of cold tolerance in algae	$76,251
PN15033/2708	Modeling the long-term degradation of spent nuclear fuel dry cask canisters	$144,914
PN15034/2709	Implementation of Extremely Large Scale Building Energy Simulation Infrastructure	$119,996
PN15035/2710	Human factors issues for lighting systems	$127,824
PN15036/2711	Integrated Adaptive Resilient Asymmetric Data Security	$234,867
PN15037/2712	Signatures of plutonium tetrafluoride and plutonium metal processing	$247,559
PN15038/2713	Towards One Health Disease Surveillance - The development of a prototype data management system to address questions of how current environmental conditions affect animal movements and interactions with their surroundings.	$98,108
PN15039/2714	Highly Dispersible, Thermally Stable Core/Shell Proppants for Subsurface Stimulation	$153,027
PN15040/2715	Inorganic composites for Tc alternative waste forms	$148,368

Project ID	Project Name	FY Total
PN15041/2716	Sub-wavelength Paint with Tailored Visible and Infrared Light Scattering for Energy Applications	$97,898
PN15042/2717	Composite turbines for small hydro	$178,942
PN15043/2718	Coupling the spectral-bin cloud microphysics with chemistry/aerosol in WRF-Chem Framework	$100,086
PN15044/2719	D-T Neutron Generator Based Standard to Replace 252Cf	$153,895
PN15045/2720	Tailored Electrolytes for Lithium-Polysulfide Redox	$119,927
PN15046/2721	Multidimensional Membrane Theory to Predict Power System Oscillations	$147,235
PN15047/2722	Development of Coded Aperture Compressive Sensing Acquisition in Environment Transmission Electron Microscope	$125,109
PN15048/2723	Rheoreversible CO2-Reactive Hydraulic Fracturing Fluids for Unconventional (Tight) Oil Production	$104,449
PN15049/2724	Hot Particle Analysis Aided by a State of the Art Focused Ion Beam	$115,308
PN15050/2725	Digital Signatures - To identify a set of computationally efficient signature types that will indicate whether different classes of software are currently running in a cloud infrastructure	$222,556
PN15051/2726	Modeling underwater sound in coastal environment to accelerate development of renewable ocean energy	$200,245
PN15052/2727	Development of a Pacific Northwest National Lab Underground Nuclear Explosion Simulation Tool	$104,349
PN15053/2728	Development of a Combined High-Pressure, High-Temperature Nuclear Magnetic Resonance Rotor Capability	$72,784
PN15054/2729	Dissection and Deciphering of the Soil Microbiome	$427,030
PN15055/2730	Dynamics of Supported Noble metal Nanoparticles in the Presence of Oxidizing Environment: Application of Compressive Sensing in Environmental Transmission Electron Microscopy	$111,582
PN15056/2731	Controlled synthesis of Metal–Organic Frameworks and Core-Shell Metal–Organic Framework Composites	$60,365
PN15057/2732	Development of an computational image analysis tool	$118,017
PN15058/2733	Development of Viologen Based UltraL-low Cost and High Performance Aqueous Redox Flow Batteries	$59,663
PN15059/2734	Understanding Cellular Communication and Controlling Directional Flow of Nutrients	$204,462
PN15060/2735	Mandrake Computer System - We applied signature discovery tools to identify complex, non-traditional signatures for treaty verification. The resulting complex signatures were used to enhance the currently used, but dated, approaches	$127,800
PN15061/2736	Biological threat signatures for Bacillus anthracis	$144,924
PN15062/2737	Interfacial Engineering: A theory based approach to join dissimilar materials	$87,853
PN15063/2738	Applying the Active Data Canvas to Biological Sciences	$154,995
PN15064/2739	Image Analysis using Active Learning on Shape and Texture Features	$129,562
PN15065/2740	Climate-Related Chemistry of Internally Mixed Atmospheric Particles	$87,508
PN15066/2741	Molecular Fingerprint of Ammonium Nitrate and Fuel Oil Detonation	$186,193
PN15067/2742	Oxygen Sensors by Plastic Impregnation Using Solvent Immersion Methods	$97,872
PN15068/2743	Soil organic carbon/mineral association and aggregation processes	$149,332
PN15069/2744	Microbiome Models Across Scales - from Metabolism to Succession: A Framework for Modeling, Simulation and Theory Development for Microbial Ecology	$163,764
PN15070/2745	Exploring Multilevel Numerical Methods in Continuous and Discrete Systems for Extreme-scale Computing	$148,049
PN15071/2746	Gamma-gamma Coincidence Analysis Algorithms	$99,076
PN15072/2747	Nonstationary Climate Considerations- Floods and Consequences	$74,976
PN15073/2748	Microbiome-Exposome Interactions	$246,505
PN15074/2749	Nonstationary Climate Considerations- Climate and Hydrology	$74,970
PN15075/2750	Transactive Control of Commercial Buildings for Demand Response	$298,211
PN15076/2751	Module integration interface for Resilient Cyber Systems	$248,838
PN15077/2752	Statistical Integration of Omics Data from Microbiomes	$103,818
PN15078/2753	Microbiome responses to hydrologic regime shifts and subsequent alteration to ecosystem function	$260,315
PN15079/2754	Feasibility of a Dual-Wavelength, Dual-Scintillation Material Fast Neutron Detector Concept using Bragg-Peak Peak Detection Physics	$112,616
PN15080/2755	Making, Measuring, and Modeling Materials for Quantum Computing	$536,560
PN15081/2756	Optically Stimulated Luminescence Data Storage	$388,151
PN15082/2757	A Self-powered Acoustic Transmitter for Aquatic Animals	$64,363

Project ID	Project Name	FY Total
PN15083/2758	Chromatin activity precipitation - Microbial communities exert globally-significant impacts upon biogeochemical cycling and so community regulation of gene expression in response to environmental stimuli is important to understand. The specific objective of this study is to develop a novel approach to elucidate transcription factors and their binding sites in cells based upon allosteric binding of regulators by small molecules	$100,334
PN15084/2759	Aperture - The research is focused on the environmental control of stomatal response in plant leaves with the objective of engineering bioenergy crops for improved water-use efficiency	$96,726
PN15085/2760	Fundamental Understanding of Nucleation Processes to Assess Solution Stability and Phase Growth and Genesis	$245,070
PN15086/2761	Assessment of Geophysical tracers for characterization of Natural and Stimulated fracture Networks	$29,884
PN15087/2762	Universal Liquid Transmission Electron Microscopy Microfluidic Cells based on Salvi for Predicative Materials	$68,829
PN15088/2763	Electrolytes Enabling Low Temperature Battery Operation	$121,429
PN15089/2764	RhizoControl: Does the Rhizospheric Microbiome Influence the Plant Metabotype? A Plant Gnotobiotics Approach	$126,198
PN15090/2765	An In-situ Investigation of gamma-Aluminum Oxide Hydroxide Dissolution under High pH Conditions	$256,275
PN15091/2766	Correlation of Colloidal Interactions and Macroscopic Rheology in Concentrated Electrolyte Solutions	$124,356
PN15092/2767	Microbial Community Dynamics and Plant Phenomics with Single-Cell Gene Expression and Imaging Mass Spectrometry	$108,055
PN15093/2768	Enabling Sodium Batteries with Advanced Electrolytes	$75,143
PN15094/2769	How do non-linear microbial processes lead to linear ecosystem fluxes?	$85,329
PN15095/2770	Monitoring Diffusion of Actinide Daughters and Granddaughters in Metals for Chronometer Applications	$109,511
PN15096/2771	Discovery of Cyber/Physical Qualifiers' Relationship and Relevance to Probabilities of Detection/Non-Detection Mitigations	$101,647
PN15097/2772	Thermal- and Electro-Catalytic Routes to Conversion of Phenols to Fuels and Chemicals	$86,371
PN15098/2773	Using Multiple-Degree-of-Freedom Feedback to Auto-Tune Climate Models	$53,502
PN15099/2774	Electrocatalytic reduction of phenols and ethers	$142,529
PN15100/2775	Modeling the Interfacial Effects, Partitioning, and Production Routes of Epsilon Particles in Uranium Oxide	$113,020
PN15101/2776	Estimation of Battery State of Health using Utility and Literature Data - This research developed a model to estimate the remaining energy capacity of a li-ion battery cell or system. This work allows estimation of battery state of health to enable end users to use large scale batteries reliably	$17,429
PN15102/2777	Unmask Signatures of Cell Perturbation Hidden in the Normal Variability Between Cells	$3,552
	Total # of Projects for PNNL: 203 **Total Cost for PNNL:** $41,761,879	
	Total Administrative Cost: $9,606	
PRINCE - Princeton Plasma Physics Lab		
PPPL-022	Developing a Prototype Gyrokinetic Code Using Advanced Algorithms for Non-axisymmetric and Edge Plasmas	$45,640
PPPL-033	High-Throughput Mass Filter - Development of a mass filter that produces mass separation utilizing centrifugal and magnetic confinement of ions	$6,372
PPPL-035	Next Step Development of an Actively-cooled and Wetted Liquid Metal Divertor Target and Test Components	$5,359
PPPL-036	Fundamental Studies of Deuterium Retention in Solid and Liquid Metals	$44,041
PPPL-037	Liquid Lithium Test Stand and Textured Surface Test	$5,861
PPPL-038	Imaging x-ray spectroscopy for x-ray synchrotron radiation and high energy density experiments	$152,982
PPPL-039	Development of the Advanced Annular Couette Centrifuge	$109,333
PPPL-040	Improved Stellarators for Fusion Nuclear Missions	$127,574
PPPL-041	Development of a Plasma Data Management Program	$90,721
PPPL-042	Assessment of methodology used in estimating power plant economics	$27,199
PPPL-043	Development of Innovative Optics for Extreme Ultra Violet Lithography	$166,359
PPPL-044	Development of a Suite of Atomistic Codes for Fusion, Advanced Materials and Warm Dense Matter Applications	$105,526

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
PPPL-045	Predicting and Mitigating Runaway Electrons in Tokamaks	$53,569
PPPL-046	Simulations of Plasma Turbulence With Lithium or Other Walls	$197,549
PPPL-047	Mining Causality in Systems Science - Development of information-theoretical tools that identify causal relationships in large datasets	$56,739
PPPL-048	The Efficacy of Lithium Conditioning and Liquid Lithium Surfaces in Devices with Metallic Plasma Facing Components	$203,657
PPPL-049	Design of a flowing liquid metal wall test stand - Development of a toroidal test stand to demonstrate flowing liquid metal walls and divertor concepts for fusion devices	$102,986
PPPL-050	High Temperature Superconductors for Increased Efficiency Spherical Tokamaks	$152,446
PPPL-051	Low Temperature Plasma for Synthesis and Functionalization of Graphene	$98,766
PPPL-052	Development of an Electron Beam Diagnostic for monitoring magnetic field	$33,913
PPPL-054	Large Scale Multi-Physics Simulation of a Blanket Module	$166,614
PPPL-055	Investigation of a Plasma Mass Filter	$113,814
PPPL-056	Machine-Learning Jet Disruption Studies - Large-data statistical approach for predicting disruptions in tokamaks using a Joint European Torus disruption-relevant database	$53,681
PPPL-057	Scoping Study for a World-Leading U.S. Stellarator Program and Facility	$39,295
PPPL-058	Construction of Nb3Sn Superconducting Magnets at Princeton Plasma Physics Laboratory	$23,478
	Total # of Projects for PRINCE: 25 Total Cost for PRINCE: $2,183,474	
	Administrative Cost Paid by Laboratory Overhead	
PTX - Pantex Plant		
PX11001	Gas Gun Firing Mechanism - This project will research, design, fabricate, install and test a new gas gun firing mechanism using a new approach that eliminates problematic design characteristics of gas gun systems	$105,660
PX11005	Micro-Focus Computed Tomography	$23,427
PX11009	3-Dimensional HD Video Capture System	$9,765
PX12002	Material Qualification - Nuclear Explosive Processes	$413,121
PX12004	High Explosive Machining Hazards	$5,639
PX13005	Laboratory Information Management System & Robotic Sample Preparation	$4,074
PX13006	Simultaneous Multiple Sample Light - The objective of this project is to conduct a feasibility study on using cutting edge technology to perform simultaneous multiple sample light scattering which will allow multiple independent polymer samples to be analyzed simultaneously under different aging parameters such as temperature, humidity, and possibly radiolysis	$146,711
PX13010	Ultra Performance Gel Permeation Chromatography	$54,158
PX13011	High Performance Ion Chromatography Mass Spectrometry	$40,039
PX13012	Epoxy Removal - Plastic Bonded Explosives & Diallyl Phthalate Thermoset Resin	$863
PX13013	Synthesis & Formulation of LLM - 2,6-diamino-3,5-dinitropyrazine-1oxide - Pantex will establish methodologies for the laboratory- and pilot plant-scale synthesis of LLM-1 05 from inert precursor materials; the modification of its powder characteristics (e.g., particle size or surface area) through recrystallization, precipitation, fluid energy milling, or wet screening (if necessary); and the formulation ofLLM-105 with up to 10% Viton A using either the direct- or reverse-slurry method	$396,765
PX13016	Precision Computerized Numerical Control Mill-Lathe Machining	$1,399,285
PX13018	System Dynamic & Economic Model -High Reliability Organization - This project will continue the development of a dynamic model that will optimize the suite of controls utilized for hazardous operations	$94,311
PX14002	Acoustical Characteristics of High Explosive Detonations	$160
PX14003	Maldi Feasibility Study - In this project, the feasibility of using matrix assisted laser desorption ionization mass spectrometry will be explored	$9,488
PX14004	Active Bay Noise Reduction - Construct a modular system to actively seek and cancel the offending noise from pumps, fans, and other assorted instruments located within the bay using sensing microphones and adaptive algorithms for better attenuation of low frequency sounds which are not normally affected by typical passive components	$103,784
PX14006	Cold Pour Cast Explosive	$1,646
PX14008	Historical Thermal Cook-Off Tests - Compile historical data. Model the historical tests using Finite Element Analysis software. Evaluate existing models describing time to explosion. Attempt to modify or develop new models for time to explosion	$140,230
PX14009	Substitution Hydrogen Helium - Chemical Reactivity Test	$185,293

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
PX14010	Lightning Paths along Penetrations in Nuclear Explosive Facilities	$74,382
PX14011	High Explosive Firing Circuits & Signal Lines	$64,598
PX14012	Rheometry Gel-Time Tool - This project attempts to use the AR2000 to monitor the time at which the loss modulus curve and storage modulus curve of a given Sylgard cross over each other	$20,536
PX14014	Microcalorimetry - Decomposition	$210,795
PX14015	Determination - Vinyl KEL-F800/FK-800 - This project attempts to use a highly precise and accurate measurement of vinylidene fluoride content (by Nuclear Magnetic resonance) to measure such content in Kel-F 800 used in past lots of LX-17 and PBX 9502 in hopes of drawing correlations with mechanical strength or molecular weight	$50,947
PX14021	High Explosive Thermal Modeling	$390,360
PX14023	Applied Science Pressed Universal Hemisphere - The As-Pressed PBX 9501 Universal Hemispheres will be used in the skid test on sanded steel skid blocks to determine the H50 (drop height at which 50% of the drops will detonate	$58,402
PX14028	Organizational Health System Dynamics Model - This project will consist of two phases. In phase 1, operations and strategic objectives of the Explosives Technology Division will be analyzed and performance measures developed using the seven performance criteria developed by D. Scott Sink and Thomas C. Tuttle. In phase 2, a model will be developed for the relationship between performance of the system and selected performance criteria with historical data	$74,984
PX15001	High Speed Video of Laser Drilling and Welding	$296,021
PX15005	Robotic Quasi Pulsed Laser System	$213,185
PX15009	3D Annealing Laser Marking Process	$219,313
PX15010	Contact & Non-Contact Guaging System	$142,898
PX15011	Scheduling for Human Risk to Catastrophic Error	$98,075
PX15012	Radiographic Equivalencies for High Explosive Surrogates	$99,248
PX15015	Utilization of 2D Barcodes for Integrated Production Planning and Execution System	$46,395
PX15016	Cyber Lock System Evaluation	$88,069
PX15019	Cleaning Solvent for Roll Mill	$31,250
PX15020	Hot-Surface Ignition Temperature of High Explosive Dust Layers	$125,034
PX15025	Enhanced Diagnostic Techniques for Explosive Testing Applications	$360,744
PX15029	Additive Manufacturing for Plastic Bonded Explosives	$50,675
PX15030	Additive Manufacturing for Mock Explosives	$53,632
PX15031	Drop Hammer Diagnostics - This project would assess the data from instrumentation added to the drop hammer	$105,112
PX15032	Relationships Between Explosive Properties and Raman Spectra	$91,868
PX15033	Laser Ignition of Explosives	$137,180
PX15034	Viability of Infrared Imaging with Fiber Optic Bundles	$288,804
PX15038	Pit Temperature Evaluation - This project will use the Large Chamber Scanning Electron Microscope in the Pantex Pit Characterization Lab to monitor several pit types from different programs to measure the rate of rise of the pit surface temperature while under vacuum	$38,015
PX15039	Field Flow Fractionation - This project will acquire Field Flow Fractionation and determine its efficacy in the measurement of particle size and binder molecular weight for various WR and stockpile return materials	$518,738
PX15040	Microwave Technology - Further research is needed to develop better, more durable crucible and insulation material for the existing Pantex microwave furnace	$98,378
RR15001	High Explosive Machining Holding Fixture	$19,312
RR15002	Evaluation of Eddy Current Systems; Tube Evaluation and Test Station Replacement	$94,810
RR15003	Spectrally Encoded Imaging Feasibility Study - A new diagnostic, Spectrally Encoded Imaging , has potential as a replacement for the streak camera. This project would be to procure and assembly the various components and field this new diagnostic with high explosives.	$88,471
	Total # of Projects for PTX: 50 **Total Cost for PTX:** $7,384,650	
	Total Administrative Cost: $451,886	

SLAC - SLAC National Accelerator Laboratory		
15-001	Ultrafast Surface Chemical Transformation at the X-ray Laser Linac Coherent Light Source	$133,508
15-002	Spatial and Time Resolving Pixel Detector - Tixel	$372,356
15-003	Real Time Control of Subsurface Fractures and Fluid Flow	$261,519

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
15-004	Cpix Detector Evaluation	$169,960
15-005	Understanding Controlling Elevated-Temperature Charge Transfer	$110,301
15-006	Chemistry in Motion: Probing Enzymatic Reaction Mechanisms in Crystallo	$181,374
15-007	Investigating the Compact High Power THz Source	$547,538
15-008	Modeling Acceleration in Laser-Driven Shocks	$186,716
15-009	Center for Laboratory Astrophysics - This project brings together the scientific experimental expertise in the areas of relativistic laser-plasma interactions & shock physics with experts in astrophysics, which are traditionally pursuing observations & theory to answer the grand questions of our Universe.	$496,728
15-010	Interfacial Photo Electrochemistry Using Oxide Heterostructures	$172,785
15-011	Monolithic Area Detector for Soft X-rays and Charged Particles	$185,276
15-012	Ultrafast 11eV Source for Time-Resolved Photoemission	$128,068
15-013	Kavli Institute for Particle Astrophysics and Cosmology Cosmic Inflation Initiative	$702,305
15-014	Exploring the Scientific Capability of Momentum-Resolved Resonant Inelastic Soft X-ray Scattering for Material Science Research	$96,685
15-015	Low Dimensional Quantum Materials for Energy Applications	$173,068
15-016	New Initiative for Pioneering Research in Biology, Chemistry, and Material Science with State-of-the-Art Soft X-ray Spectroscopy	$134,369
15-017	Non-Fermi Liquid Metals - The goal of this project is to foster collaborations among theorists in Photon Science to investigate quantum field theories of strongly correlated systems	$133,514
15-018	Development of Nano Ultrafast Electron Diffraction at SLAC	$112,928
15-019	Prototype for a Microjoule Class Femtosecond Extreme Ultra Violet Source	$93,816
15-020	Hybrid Organic/Inorganic Perovskite Films Solar Absorbers: What is the role of defect?	$156,903
15-021	Large Underground Xenon Dark Matter Search	$786,203
15-022	PolyUbiquitin Structural Biology - This project aims to develop novel structural biology methodologies for studying structure-function relationships of protein complexes involved in post-translational modifications, in particular complex polyubiquitin chains with specific linkage types and lengths	$231,083
15-023	Cross-Platform Multiple Length Scale Imaging System for Energy Storage Materials	$151,174
15-026	Beyond the Current Limitations of Water Splitting Catalysts	$50,163
15-027	Structural Characterization of Electrolyte and Polymer Gated Electronics to Better Control Device Properties	$26,318
15-029	CO2 to Methanol Conversion	$85,054
15-030	Battery Electrode/Electrolyte Studies	$4,859
15-031	Ultrafast Electron Diffraction Experiments	$400,496
	Total # of Projects for SLAC : 28 **Total Cost for SLAC :** $6,285,067	
	Administrative Cost Paid by Laboratory Overhead	
SNL - Sandia National Lab		
165535	Pattern ANalytics to Support High-performance Exploitation and Reasoning	$4,457,211
165537	Composing Formally Verified Modules to Analyze Security and Reliability Properties of Large-Scale High-Consequence Systems	$523,752
165545	Precision Laser Annealing of Focal Plane Arrays	$335,669
165547	Computer Network Deception - This project seeks to develop, implement, and test a novel computer network operations architecture that enables proactive defense by managing and monitoring the enterprises resource allocations and network flows. It will enable the detection and identification of anomalous access and intrusions, to adjust to the dynamic nature of the adversary and to provide a mechanism to discover and react to the adversary's attacks in methodical and proactive manner. Additionally, it is developing technologies that allow network defenders to gather information on the adversary's tools, tactics, and procedures	$279,923
165554	Wound Ballistics Modeling for Blast Loading, Blunt Force Impact, and Projectile Penetration	$404,641
165555	Ground Moving Target Extraction, Tracking, and Image Fusion	$297,877

Project ID	Project Name	FY Total
165577	Quantum Graph Analysis: Engineering and Experiment - The development of quantum algorithms to address problems such as data mining of attributed relational graphs is largely unexplored. This project uses a combined theoretical/experimental effort to implement QPR in a system of trapped-ion quantum bits and identify classical web-graph analysis methods most relevant to national security and seek to develop more computationally efficient quantum alternatives	$606,717
165607	Unknown Pathogen Detection in Clinical Samples: A Novel Hyperspectral Imaging and Single Cell Sequencing Approach	$880,188
165609	The Engineering and Understanding of Nanoparticle/Cellular Interactions	$618,571
165611	Operationally-Relevant Cyber Situational Awareness Tool Development	$376,947
165613	Cognitive Computing for Security	$245,909
165614	HostWatch: Situational Awareness of Machine State for Cybersecurity	$489,371
165615	Sublinear Algorithms for In-Situ and In-Transit Data Analysis at Exascale	$420,537
165616	Strong Local-Nonlocal Coupling for Integrated Fracture Modeling	$460,724
165617	Efficient Probability of Failure Calculations for QMU using Computational Geometry	$722,488
165619	Advanced Small Modular Reactors using S-CO2 Power Conversion with Dry Cooling	$628,605
165620	Active Suppression of Drilling System Vibrations for Deep Drilling	$758,852
165630	Climate Induced Spillover and Implications for US Security	$444,686
165631	Natural Gas Value-Chain and Network Assessments - The project will develop capabilities to identify the propagation pathways of natural gas prices or supply shocks, through development of a novel agent-based model that can represent both equilibrium and dis-equilibrium dynamics to capture shock propagation through the system	$528,672
165632	Novel Metal-Organic Frameworks for Efficient Stationary Energy Sources via Oxyfuel Combustion	$745,903
165633	Sandia's Twistact Technology: The Key to Proliferation of Wind Power	$511,456
165635	Calibration, Validation, and Uncertainty Quantification for Turbulence Simulations of Gas Turbine Engines	$539,655
165636	Developing Next Generation Graphene-Based Catalysts	$267,414
165637	Coating Strategies for High Energy Lithium-Ion	$42,329
165646	Quantitative Imaging of Turbulent Mixing Dynamics in High-Pressure Fuel Injection to Enable Predictive Simulations of Engine Combustion	$800,591
165649	A Process and Environment Aware Sierra/Small Modular Cohesive Zone Modeling Capability for Polymer/Solid Interfaces	$564,828
165652	Prediction of Spark Discharge Paths and Voltages	$475,937
165656	Time-Resolved Optical Measurements of Shock-Induced Chemistry in Energetic Materials	$759,190
165668	Methane Hydrate Formation on Clay Mineral Surfaces: Thermodynamic Stability and Heterogeneous Nucleation Mechanisms	$506,413
165669	Determination of Aerosol Scattering Characteristics for Atmospheric Measurements	$221,237
165670	Appraisal of Hydraulic Fractures using Natural Tracers	$440,582
165676	Development and Field-Testing of a Diagnostics Platform for Global Syndromic Disease Surveillance	$545,807
165679	Processing Radiation Images Behind an Information Barrier for Automatic Warhead Authentication	$437,646
165682	Radiography Signature Science of Homemade Explosives	$398,777
165683	Distinguishing Bioengineering from Natural Emergence in Biothreat Genomes	$510,715
165685	Jam-Proof Wireless Communications - This project will combine advanced physical layers, detection, and cognitive networking to produce a new form of "jam proof" wireless communications that will meet high security needs of DOE and others. This project will incorporate attack detection and triangulation as an active component of the cognitive network, providing real-time data and geo-location of possible threats and allow specific action to be taken by the end user	$558,446
165686	Using Electroencephalography and other Methods to Understand Domain-Specific Visual Search	$295,420
165687	Improved Pulse Shape Discrimination in a Multicomponent Water/Organic System	$503,600
165692	Low Energy Electron Microscopy - Photo-emission Electron Microscopy Studies of Localization Mechanisms in InGaN-Based Heterostructures	$547,795
165694	Ion-Conduction Mechanisms in NaSICON-Type Membranes for Energy Storage and Utilization	$270,531

Project ID	Project Name	FY Total
165696	Programmable Nanocomposite Membranes for Ion-Based Electrical Energy Storage	$269,005
165697	Science-Based Design of Stable Quantum Dots for Energy-Efficient Lighting	$500,616
165698	Predicting Growth of Graphene Nanostructures using High-Fidelity Atomistic Simulations	$482,106
165700	Tunable Quantum Dot Solids: Impact of Interparticle Interactions on Bulk Properties	$480,191
165701	Nonlinear Response Materials for Radiation Detection	$365,105
165702	Active Plasmonics from the Weak to Strong Coupling Regime	$666,878
165703	Minority Carrier Lifetime Characterization and Analysis for Infrared Detectors	$174,257
165704	Electrically Injected Ultra Violet-Visible Nanowire Lasers	$536,052
165705	Efficient Heat Removal from Power-Semiconductor Devices using Carbon Nanotube Arrays and Graphene	$577,890
165706	Fabrication and Characterization of a Single Hole Transistor in p-type GaAs/AlGaAs Heterostructures	$201,461
165707	Optical Polarization Based Genomic Sensor - The purpose of this project is to explore innovative genomic sensing methodologies based on interactions between light and nanoparticle assemblies for detection of DNA	$331,424
165708	Programmable Piezoelectric Radio Frequency Filters	$461,110
165713	Exploring the Possibility of Exotic Ground States in Twisted Bilayer Graphene	$243,298
165714	Closing the Nutrient Utilization Loop in Algal Production	$245,190
165724	Understanding H Isotope Adsorption and Absorption of Aluminum Alloys using Modeling and Experiments	$510,968
165725	Carbon Composite Micro-electromechanical Systems Accelerometer	$568,127
165726	Organosilicon-Based Electrolytes for Long-Life Lithium Ion Primary Batteries	$612,269
165732	Electrical Breakdown Physics in Photoconductive Semiconductor Switches	$524,025
165733	Z-pinch X-ray Sources for 15-60keV - The purpose of this project was to develop higher photon energy x-ray sources than are currently available on the Z machine. Simulation tools are being developed to model energetic electrons within z-pinch plasmas and have provided insight into the mechanisms that allow intense emission from inner-shell emission lines.	$505,748
165736	Implementing and Diagnosing Magnetic Flux Compression on Z - The Z pulsed-power facility offers a unique platform for producing very large magnetic fields coupled to very high-energy-density plasmas. One way to achieve this is through magnetic flux compression, which is unclear due to poorly understood physics. This project will evaluate and eventually test on Z the most promising diagnostic methods that have been proven to work on smaller-scale facilities	$356,155
165738	Evaluation of Warm x-ray Bremsstrahlung Diodes on Z - The purpose of the project is to create a new type of warm x-ray bremsstrahlung source that could be fielded on the Z accelerator. This would represent a significant enhancement to the range of radiation sources available for radiation effects sciences experiments, thus providing an enhanced capability to understand and simulate nuclear weapons effect	$350,109
165739	High Pressure Pre-Compression Cells for Planetary and Stellar Science	$372,079
165741	Radiation Susceptibility of Memristive Technologies in Hostile Environments	$372,981
165746	Exploring New Frontiers in Kinetic Physics in Inertial Confinement Fusion	$247,452
165767	Identification of Nucleic Acid Biomarkers of Infection in Blood	$888,106
165822	Consolidated Bioprocessing and Biofuels Production Platform	$42,440
165823	Development of a Micro-electromechanical Systems Dual-Axis Differential Capacitance	$50,254
165824	Understanding Membrane-Nanoparticle Interactions: Implications for Developing Novel Medical Therapeutics and Functional Materials	$286,399
166140	Adaptive Multimodel Simulation Infrastructure	$26,456
166141	Kernel and Meshless Methods for Partial Differential Equations	$34,740
166152	High Precision Testing and Structural Analysis of Lithium Ion Batteries	$41,662
166153	Upscaling Ab-Initio Quantum Chemistry Models for Nonequilibrium Reacting Flow Simulations	$44,611
166154	In-situ Techniques to Characterize Creep and Fatigue in Freestanding Metal Thin Films	$42,794
166537	Enabling Bidirectional Modality Transitions in Collaborative Virtual Environments	$37,038
166636	Multiscale Modeling of Shape Memory Alloys Materials	$26,525
168763	Creating a Novel Silicon Substrate for the Metal Organic Chemical Vapor Deposition Growth of Low Defect Gallium Nitride	$29,608
170798	Development of a Rapid Field Response Sensor for Characterizing Nuclear Detonation Debris	$115,281

Project ID	Project Name	FY Total
170800	Real-Time Case-Based Reasoning using Large High-Dimensional Data - This project intends to create an underlying case-based reasoning engine for high-dimensional data through modeling and will present a new paradigm in high-dimensional search, which will provide new capabilities in machine guided decision making. It will learn the structure of a dataset in high-dimensional space to construct an inverted index for the high-dimensional space; this index will be applicable to any measure of similarity with any configuration across multiple domains	$85,081
170801	Recombinant Vesicular Stomatitis Virus for Therapeutic Antibody Epitope Mapping and Vaccine Development	$85,044
170803	Integration of a Neutron Sensor with Commercial Complementary Metal-oxide Semiconductor	$124,176
170804	Systems-Level Synthetic Biology for Advanced Biofuel Production	$128,528
170805	C2R2: Compact Compound Recirculator/Recuperator for Renewable Energy and Energy Efficient Thermochemical Processing	$128,663
170806	Liquid Metal Embrittled Structures for Fragmenting Warheads	$128,163
170973	Model Reduction for Quantum Technologies	$130,845
170974	Determination of Surface-Mediated Degradation Products in Energetic Materials at Critical Interfaces	$113,780
170975	Development of High-Fidelity Models for Liquid Fuel Spray Atomization and Mixing Processes in Transportation and Energy Systems	$124,623
170976	Development of Quality Assessment Techniques for Large Eddy Simulation of Propulsion and Power Systems in Complex Geometries	$125,046
170977	Fiber Optic Streak Spectroscopy of Gas Cells in Extreme Radiation Environments	$125,216
170995	High Fidelity Forward Model Development for Nuclear Reactor Spent Fuel Technical Nuclear Forensics	$125,935
170996	Radar Detection of Personnel Obscured by Foliage	$129,956
171069	Polyfunctional Desorption of Oil from Shales	$409,047
171117	Numerical Methods for Efficient Simulations and Analysis of Circuits with Separated Time Scales	$103,161
171381	Detecting Seasonal Changes in Permafrost Using In Situ Seismic Velocities, Near-Field Soil Moisture Monitoring, and Remote Sensing	$438,898
171525	Use of Slurries for Salt Caverns Abandonment	$176,446
172334	Decoupling Superconducting Transmon Qubits from their Quantum Bus/Readout Resonators to Enable Scaling	$150,710
173019	Understanding and Engineering Lignolysis for Renewable Chemical Production	$698,980
173020	EKSG: A Universal Sample Prep Technology for Multidimensional Bioscience	$260,706
173021	In Vivo High Throughput Transcriptomics to Elucidate the Spatial and Temporal Dynamics of Host-Pathogen Interactions	$372,535
173024	Simulation Capability and Computational Assessment of Memristors as Beyond-CMOS Logic and Memory Devices	$722,376
173025	Coupling Computational Models: From Art to Science	$623,261
173026	Towards Rigorous Multiphysics Shock-Hydro Capabilities for Predictive Computational Analysis	$886,596
173028	Analyst-to-Analyst Variability in Simulation-Based Prediction	$329,256
173029	User-Accessible Unified Manycore Performance-Portable Programming Model	$469,902
173031	APEX: Application Characterization for Exascale Systems	$197,581
173034	Using Trusted Execution Environments to Provide Monitoring and Protection of Mobile Operating Systems	$313,512
173035	Using Linkographies of Cyber Attack Patterns to Inform Honeytoken Placement	$259,878
173036	Measuring Human Performance within Computer Security Incident Response Teams	$101,749
173037	Using Machine Learning in Adversarial Environments - This project will embed machine learning with a game theoretic framework that performs adversarial modeling, develops methods for optimizing operational response based on machine learning, and integrates the resulting optimization codebase into the existing infrastructure developed by a previous LDRD project (Hybrid). This work aims to advance the science of attacker modeling by considering game-theoretic methods, and by engaging experimental subjects with red teaming experience in trying to actively circumvent an intrusion detection system, and learning a predictive model of such circumvention activities. In addition, it will generate metrics to test that a particular model of an adversary is consistent with available data	$409,675

Project ID	Project Name	FY Total
173039	Novel, Semi-Destructive Failure Analysis Technique for Stacked Die - Stacked die for 3-dimensional integration (3-DI) are rapidly becoming a reality for commercial applications, including field programmable gate arrays and complimentary metal-oxide-semiconductor devices. From a failure analysis (FA) perspective, 3-DI presents many challenges because the die are extremely thin and fragile. This project investigates the semi-destructive micromachining of either the Si substrate or the underfill material from the edge of a die to access connections to device circuitry. To our knowledge, this is the first attempt to remove material from the edge of a die for targeted drilling and connection to buried conductors while retaining device functionality	$248,501
173043	Speech Detection with Micro-electromechanical Systems Zero Power Acoustic Sensor	$288,459
173044	New Methods for Characterizing Hardware Protocols	$260,304
173045	Enabling Nanoink Materials for Direct Write and Additive Manufacturing	$311,065
173046	Low Observable Technology - This is a classified project	$219,805
173047	Automated Blind Signal Characterization	$259,741
173048	Micro Scale, Low Power Radio Frequency Power Detector using Integrated Circuit Based Calorimeters	$215,569
173049	Advanced Target Phenomenology for Emergent Threat Detection	$354,128
173050	Carrier Lifetime Mapping for Infrared Detectors	$214,120
173051	High Speed Remote Sensing of Optical Signatures	$189,570
173052	Reversible Electrical Interconnect - This project will explore recently developed products such as anisotropic conductive films (ACF), and conductive polymers to develop a reversible electrical interface test capability which would allow the large area detectors, such as focal plane arrays, to be tested and characterized prior to being committed to the highly valued and characterized read-out integrated circuit electronics unit.	$430,062
173055	Persistent Space Situational Awareness - This project will provide a modeling and simulation environment to evaluate sensor capabilities and modalities that will address the national need for solutions to rapidly evolving threats to US Space Systems. This work will use/adapt existing sensor models to assess with a low to medium level of fidelity the utility of polarization and multispectral collections in identifying space objects, anchored by surrogate sensor collections	$351,206
173056	Co-Design of Sensors and Analysis Methods for Optical Remote Sensing of Spectral-Temporal Signals	$733,376
173058	Advanced Beamsplitter Fabrication Techniques for Enabling a Novel Compact Multispectral Diffraction-Limited Imaging System	$280,291
173059	Deployable, Ground-Based, Discrete Zoom Telescope	$115,645
173060	Broadband Digital Active-Electronically-Steered-Array Radar Prototype for Multi-Mission Applications	$748,563
173061	Motion Estimation and Compensation for Focusing Maritime Targets	$249,528
173062	Developing a System for Testing Computational Social Models using Amazon Mechanical Turk	$250,496
173063	Holistic Portfolio Optimization using Directed Mutations	$249,932
173064	Imaging Light Detection and Ranging and Raman Imaging Light Detection and Ranging through Fog and Dust for Maritime Surveillance	$379,421
173065	Modeling and Experimental Validation of Jet Vane Forces for a New Type of Missile Defense Kill Vehicle Steering System	$416,114
173066	Adaptive Waveform and Signal Processing Techniques that Mitigate Adversarial Anti-Access/Area Denial Technology	$450,792
173067	Dynamic Analytical Capability to Better Understand and Anticipate Extremist Shifts Within Populations under Authoritarian Regimes	$393,143
173069	Imaging Mass Spectrometry for Biometric and Forensic Detection	$338,628
173070	Quantifying the Uncertainty of Risk Assessment for High Consequence Flight Tests	$378,783
173071	Assessing the Security Impact of Moving Target Defense Approaches	$251,547
173073	Optical Detection of Ultratrace Molecules	$152,095
173074	Technology Improvements for the Design and Analysis for Hypersonic Scramjets for Prompt Strike Applications	$287,262
173076	The Effect of Proppant Placement on Closure of Fractured Shale Gas Wells	$274,826
173078	The Role of Real-Time Decision Making in Grid Resilience	$432,653
173079	Next Generation Global Atmosphere Model	$538,347
173090	An Advanced Decision Framework for Power Grid Resiliency	$865,907

Project ID	Project Name	FY Total
	United States Department of Energy **Laboratory, Plant or Site Directed Research and Development Report** **Project List -- Fiscal Year 2015**	
Project ID	**Project Name**	**FY Total**
173092	Fractal-Like Materials Design with Optimized Radiative Properties for High-Efficiency Solar Energy Conversion	$509,256
173094	Measurements and Modeling of Black Carbon Aerosols in the Arctic for Climate-Change Mitigation	$731,612
173095	High Fidelity Coupling Methods for Blast Response on Thin Shell Structures	$625,213
173096	Modeling Primary Atomization of Liquid Fuels Using a Multiphase Direct Numerical Simulation, Large Eddy Simulation Approach	$484,857
173097	Experiments and Computational Theory for Electrical Breakdown in Critical Components	$573,004
173098	Mechanics of Battery Degradation through Stress Driven Rearrangement of Percolated Conductive Networks during Discharge and Cycling	$797,705
173100	Monitoring, Understanding, and Predicting the Growth of Methane Emissions in the Arctic	$666,677
173101	Imaging the Subsurface with Upgoing Muons	$417,679
173102	Fundamental Study of Disposition and Release of Methane in a Shale Gas Reservoir	$570,466
173103	Sandia Enabled Communications and Authentication Network using Quantum Key Distribution	$5,233,522
173104	New Capabilities for Hostile Environments	$6,187,596
173105	Combinatorial, Microscale Fuel/Oxidizer Formulations for the Systematic Determination of Homemade Explosives Properties	$301,269
173106	Decontamination of Radiological Contaminated Materials using Magnetotactic Bacteria	$483,769
173107	Tamper Indicating Materials using Microvascular Networks	$427,938
173108	Video Motion Detection Fused Radar - The First Volumetric Ultra-Low Nuisance Alarm Rates Sensor for Exterior Environments	$451,322
173110	Development of a Novel Nanoparticle Delivery Vehicle for Pre-Treatment with Nerve Agent Countermeasures	$639,196
173111	Real-Time, Autonomous Field Surveillance for Vector-Borne Pathogens	$523,265
173112	Online Mapping and Forecasting of Epidemics using Open-Source Indicators	$321,300
173113	Single-Volume Neutron Scatter Camera for High-Efficiency Neutron Imaging and Source Characterization	$555,624
173114	A Complex Systems Approach to More Resilient Multi-Layered Security Systems	$493,540
173115	Denial of Use of Bulk Chemical Agents and their Precursors	$169,355
173116	Multi-Resolution Characterization and Prediction of Environmentally-Assisted Intergranular Fracture	$760,584
173117	Phonon Scattering at Mobile Ferroelastic Domain Walls: Toward Voltage Tunable Thermal Conductivity	$481,867
173118	In Situ Study of Surface-Mediated Explosive Degradation using Surface Enhanced IR-Vis Sum Frequency Generation	$391,931
173119	Scanning Ultrafast Electron Microscopy for Charge Carrier Lifetime Imaging with High Spatial Resolution	$392,654
173121	High Fidelity Modeling of Ionic Conduction in Solids	$463,429
173122	Understanding and Overcoming Materials Challenges for Ain: A Scientific Foundation for Next-Generation Power Electronics	$369,673
173124	Harnessing Multiscale Periodicity of 2D-Crystals for Flexible Adaptable Broadband Optics	$469,727
173126	Reduced Dimensionality Lithium Niobate Microsystems	$539,902
173127	The Anatomy of the Minority Carrier - Atomic Cluster Interaction in Semiconductors	$509,173
173128	Seebeck Enhancement via Quantum Confinement in Metal Oxide Semiconductor Field-effect Transistors: Towards Monolithic On-Chip Cooling	$632,772
173129	Beyond Moore's Law Through 3D-Integrated Circuit Fabrication	$596,345
173130	A New Approach to Entangling Neutral Atoms	$529,649
173131	Fundamental Scaling of Microplasmas and Tunable Ultra Violet Light Generation	$505,701
173132	Zero-Power Wake-Up Device	$176,372
173133	Metal-Organic Framework Thin Films as Gas-Chromatography Stationary Phases for the Detection of Toxic Industrial Chemicals	$250,026
173134	A Space-Like Low-Energy Proton Test Environment to Rapidly Qualify Advanced Microelectronics for Flight Readiness	$253,783
173139	Exploring Revolutionary Thermoelectric Performance via Quantum Confinement	$312,975
173140	Synthetic Deoxyribonucleic Acid for Highly Secure Information Storage and Transmission	$136,012
173142	Probing Small-Molecule Degradation to Counter Enzyme Promiscuity	$215,404
173153	Cognitive Data Science for Neutron Generator Predictive Pattern Analysis	$542,308
173154	Radiation Hardness of Micro-electromechanical Systems Capacitive and Electromagnetic Accelerometers	$513,493

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
173156	Recycling Scandium and Erbium from Nuclear Weapon Manufacturing Operations	$582,775
173180	Compressed Sensing to Support Reduced Flight Testing	$337,239
173182	Non-Linear Transmission Line Based Technology	$774,409
173183	Organic Semiconducting Materials for Thin-Film Optoelectronic Devices	$640,154
173184	Electro-Syntheses of Intermetallic Couples as Thin-Film Heat Sources for Advanced Thin-Film Thermal Batteries	$585,089
173186	Engineered Composite Materials Science and Technology for Next Generation Glass to Metal Seals	$569,069
173187	Reconfigurable Matching Networks for High-Efficiency GaN Power Amplifiers	$351,849
173188	Welding of Advanced Shape Memory Alloys	$251,803
173189	Wavelength Conversion Arrays for Optical and X-Ray Diagnostics at Z	$455,093
173190	Investigating Laser Preheat and Applied Magnetic Fields Relevant to the MagLIF Fusion Scheme	$794,260
173191	Creating the Foundation of Next-Generation Pulsed-Power-Accelerator Technology	$1,369,925
173192	An ion-Neutron Electron-Gamma SIMulation System for Radiation Testing of Optical Components for Weapons Systems	$485,115
173193	Next Generation Multiscale Plasma Codes	$249,593
173194	A Mesh-Free Method to Predictively Simulate Solid-to-Liquid Phase Transitions in Abnormal Thermal Environments	$516,942
173269	Multifunctional Integrated Sensors - This project is focused on developing self-powered multifunctional sensor nodes to achieve generic sensing platforms suitable for wireless network integration and real-time monitoring in a range of applications such as unattended ground sensing, infrastructure monitoring, and soldier health monitoring	$42,329
173331	Advanced Uncertainty Quantification Methods for Circuit Simulation	$445,658
173339	Chemical Vapor into Liquid Encapsulation of Microorganisms for Hazardous Agent Detection	$46,400
173490	Plasmonic-Based Optical Modulators and Switches	$64,315
173491	Simulation of Optical Phenomena in the Upper Atmosphere	$60,938
173492	3D Imaging with Structured Illumination for Advanced Security Applications	$243,754
173493	Metal Organic Frameworks for Targeted, Triggered, Sustained, and Systemic Delivery of Antibiotics	$243,940
173494	Classifier-Guided Sampling for Complex Energy System Optimization	$221,975
173495	Electrostatic Coating with Naked Copper Nanoparticles - This project will develop low-cost nanoinks for interconnect applications, focusing on nanocopper inks. An alternative coating method that allows for conductive film formation on a variety of substrates is desirable, both as an alternative to conventional conductive thin-film processing, as well as the emerging field of flexible electronic and photovoltaic devices	$26,490
173496	Piezoelectric Nano-Optomechanical Systems - Sandia has developed new capabilities in the micromachining of piezoelectric thin films, and these capabilities can be used to study optomechanics in piezoelectric materials. This project will use piezoelectric materials to allow the acoustic waves and electric fields to be coupled intrinsically by the material, which will allow amplitude and frequency modulation to be transferred from electrical to acoustic to optical signals and vice-versa. This information transfer allows new functionality and interactions in chipscale, electro-optomechanical systems	$80,293
173653	Utilization of Reactive Metal Films for Self-Healing Metal Matrix Composites	$31,153
173655	Fully Coupled Simulation of Lithium Ion Battery Cell Performance	$47,511
173662	Predicting the Occurrence of Mixed Mode Failure Associated with Hydraulic Fracturing	$85,674
173664	Predictive Engineering Tools for Novel Fuels - This project aims to use the best combustion engineering tools available to explore methods for increasing efficiency and reducing the climate effects of energy utilization. We will develop and expand predictive engineering models, employing artificial neural networks and predictive data analysis tools to infer quantitative structure-performance relationships. These relationships will serve as a first sorting tool for more detailed and fundamental structure-activity investigations	$42,844

Project ID	Project Name	FY Total
173665	Defect Characterization in Low Bandgap Materials - This project will conduct research into specific generation-recombination and dark current producing mechanisms of modern III-V material systems to aid in minimizing their impact on device performance. We will utilize Deep Level Transient Spectroscopy to quantify the defects existing in materials and study defects in ηβη absorbers and correlate measurements with growth conditions and crystal structure	$72,028
173666	Process-Structure-Properties Relationship of Electrodeposited Au Thin Films used in Thermoelectric Power Generation Device	$253,653
173667	Active Learning in the Era of Big Data - This project aims to tackle the two major impediments to implementing active learning for big-data in practice: 1.) the logistics of query distribution and collection, and 2.) the lack of efficient algorithms with guarantees. This research will both extend the scalability of active learning approaches and expand the use of active learning techniques by lowering the barrier of complexity. It will also advance the science of machine learning by enhancing the theoretical understanding of active learning constraints and guarantees	$46,962
173669	Advanced Imaging Algorithms for Radiation Imaging Systems - Because of their low natural background, difficulty to shield, and unique association with special nuclear material fast-neutron imaging provides a promising means for the detection of special nuclear material. To make these systems useful for end-user applications, robust reconstruction and analysis algorithms must be developed that provide detailed information on the location, energy spectrum, and intervening material. This project will develop the algorithms that will bring the analysis from qualitative images to quantitative attributes of objects containing special nuclear material	$46,934
173670	Engineering Bioelectronic Signal Transduction using the Bacterial Type III Secretion Apparatus	$45,559
173867	A Framework for Wind Turbine Design under Uncertainty	$44,264
173868	Modeling of Nonlocal Electron Conduction for Inertial Confinement Fusion	$42,329
173878	Reducing the Adverse Effects of Boundary-Layer Transition on High-Speed Flight Vehicles	$212,064
173881	Development of a Spatially Resolved Microwave Interferometer	$260,467
173882	Reducing Computation and Communication in Scientific Computing: Connecting Theory to Practice	$279,832
173883	Scaling up Semiconductor Quantum Computers through Multiscale Analysis	$265,014
176115	Advanced Deprocessing Techniques to Investigate White Light and other Imaging	$183,941
176117	Novel Materials and Devices for Solid-State Neutron Detection	$109,809
176311	Rocket Engine Test System for Development of Novel Propulsion Technologies	$50,026
176312	Understanding Photo-induced Oxidation Mechanisms of Volatile Organic Compounds	$92,917
176400	The Development of a Novel AlGaN Defect Detection, Localization, and Analysis Methodology	$143,216
176605	Tightly Coupled Global Positioning System/Inertial Navigation System Flight Test Demonstration	$10,829
177962	Room Temperature Solid-State Deposition of Ceramics	$301,125
177964	Novel Cathode Materials for Large-Scale Electrical Energy Storage	$225,127
177965	Game Theory for Proactive Dynamic Defense and Attack Mitigation in Cyber-Physical Systems	$165,745
177966	Towards Global Persistent Surveillance - Recent advances in focal plane array technologies suggest that large-scale persistent space-based electro-optical sensors may be realizable within the next decade, possibly at significantly lower cost. This project previously focused on creating numerical models to quantify the interdependencies between design parameters. FY15 efforts completed performance analysis of the postulated persistent sensing architectures. The most promising sensor architectures were analyzed for relevance to national security needs, and a first-order estimate of cost drivers and areas for potential savings was developed	$231,760
177967	Cavity Electron Density Measurements within Pulsed Radiation Environments	$234,265
178470	Modeling Information Multiplexing in the Hippocampus - This project developed and tested a novel theory of how neurons in the hippocampus integrate, process, and transmit different information streams. The goals of the project were to 1) test the hypothesis that hippocampal neurons multiplex information from two different input streams, and 2) generate a description of this multiplexing algorithm that will be implementable in computer systems. Successful outcomes could aid the development of new brain-inspired algorithms for multimodal data integration	$246,752
178661	Direct Observation of Electrothermal Instability Structures in the Skin Layer of an Intensely Ohmically Heated Conductor	$533,316

United States Department of Energy
Laboratory, Plant or Site Directed Research and Development Report
Project List -- Fiscal Year 2015

Project ID	Project Name	FY Total
178667	Predicting the Multiscale, Mechanical Response of Additively Manufactured Materials across a Wide Spectrum of Loading Conditions	$790,451
178670	Decision Analytics for Complex Supply Chain Networks	$720,873
178675	Robust Operations and Algorithms for Quantum Information Systems	$618,330
178851	Multi-Resolution Image Fusion - The goal of this project is to create software tools that allow a target to be detected and identified with a high-resolution imaging sensor and then tracked with a more persistent, low-resolution sensor. An important aspect of this project is collecting data suitable for testing newly-created algorithms	$391,327
178917	Unconventional Approaches to Neutron Generators	$575,265
179224	Building the Scientific Basis for Cyber Resilience of Critical Infrastructure	$252,634
180800	Exploring Rapid Nuclear Material Assay with a Pulsed Associated Particle Neutron Generator	$47,679
180811	Clustered Regularly Interspaced Short Palindromic Repeats (a type of Deoxyribonucleic Acid sequence) Technology for Biodefense and Emerging Infectious Disease Countermeasure Development	$703,589
180812	Bio-Emulative Metal Organic Framework-Based Lignin Degradation Catalysts	$519,080
180814	Predictive Pathogen Biology: Genome-Based Prediction of Pathogenic Potential and Countermeasures Targets	$514,889
180817	Coupling Chemical Energy with Protein Conformational Changes to Translocate Small Molecules Across Membranes	$42,601
180818	In Situ Compressed Sampling and Reconstruction of Exascale Unstructured Mesh Datasets	$343,264
180819	Pacific Institute for the Mathematical Sciences: Memristor-Based Processing-in-Memory-and-Storage	$429,775
180820	Advanced Data Structures for Improved Cyber Resilience and Awareness in Untrusted Environments	$554,919
180821	Topological Design Optimization of Convolutes in Next Generation Pulsed Power Devices	$301,743
180822	Data-Driven Optimization for the Design and Control of Large-Scale Systems	$214,761
180823	Identification of Markers of High Reynolds Averaged Navier-Stokes Uncertainty for Model Improvement in Engineering Flows	$258,842
180824	Staghorn: An Automated Large-Scale Distributed System Analysis Platform - The last decade has seen a tremendous increase in scale, complexity, and use of massive distributed systems. Nearly every network-enabled service is being redesigned into a loosely-coupled distributed system. As these systems have increased in complexity and scale, our ability to analyze network protocols and interactions has remained stationary. This project will create a new analysis platform for large-scale distributed systems, which will enable automated attack path discovery through restoration of system-wide states coupled with network message modifications	$251,884
180825	Intelligent Control for Autonomous Penetration - This project will develop and demonstrate intelligent control of autonomous drilling through heterogeneous materials to access and defeat hardened and deeply buried targets	$401,070
180826	Hypersonic Autopilot Adaptive Control for Aerodynamic Uncertainty Mitigation - This project will develop an L1-Adaptive Control to supplement existing nonlinear control strategies for a representative hypersonic vehicle and design a center-of-mass adaptation to provide a mechanical, real-time method for manipulating stability in the presence of large, 1-Adaptive Control identified uncertainties. Independently and together, the 1-Adaptive Control and center-of-mass stability augmentation systems will deliver new, forward-looking control solutions for operational hypersonic vehicles	$344,260
180827	Additive Manufacturing of Integrated Functional Materials - This is a classified project	$250,298
180828	Patterns of Life via High Performance Computing - Within US government agencies, there exists a demand for methods and tools that enable the discovery and exploitation of foreign nuclear weapons development programs and proliferation networks. This project will create statistics-based algorithms to represent the operations tempo for a region of interest. It will also investigate algorithm execution in Sandia's High Performance Computing environment. If successful, this solution will provide a pathfinder for analytical tools that highlight anomalous activity and discover hidden relationships over wide areas and across multiple functional domains	$99,801
180829	Mitigating Information Disclosure Vulnerabilities - This is a classified project	$275,012

Project ID	Project Name	FY Total
180830	Confidence in Cyber Modeling and Simulation - The purpose of this project is to create a methodology for establishing the credibility of emulation-based models of distributed systems. This project builds upon Sandia's experience in validating computational physics models and will adapt those techniques to the domain of cyber security. The resulting methodology will contribute to the scientific maturity of cyber security modeling and simulation	$221,765
180831	Flux: Toward a General Model of Moving Target Defense Efficacy - The goal of this project is to establish a validated foundational model describing why Moving Target Defense (MTD) controls succeed or fail. This will include the development of a general model we hypothesize will identify current known problems with MTD solutions at a variety of levels, ranging from application-level controls to host controls to network controls	$170,613
180832	High Fidelity Virtualization for Large Scale Mobile Emulytics	$373,933
180833	Dynamic Multi-Sensor Multi-Mission Optimal Planning Tool	$421,104
180834	DISeG: Data Inferencing on Semantic Graphs	$235,077
180835	Microsensor Arrays for Energy Efficiency, Emission Monitoring and Explosives Detection	$297,045
180836	Exploring 2D Materials for Remote Sensing Applications	$273,406
180838	Internal Structure Mapping with X-Ray Phase Contrast Imaging	$427,264
180839	Dim Target Tracking using an Adaptively Tuned Velocity Matched Filter on High Performance Computing using A Priori Information for Real-Time Tracking	$420,393
180840	Exploitation of Optical Polarimetry for Remote Sensing	$295,613
180841	Pinned Photodiode Pixel Development Enabling High Performance Visible Focal Plane Array	$333,043
180842	Biologically-Enabled Remote Sensing for Real-Time Detection and Threat Response	$365,928
180844	Pulsed Ultraviolet Light-Assisted Chemical Etching for Failure Analysis of Advanced Complimentary Metal-oxide Semiconductor Circuitry	$206,769
180845	Hyperspectral Hypertemporal Database Reference Search Project	$395,202
180846	Improving Radiation Spectra Identification for Radioactive Materials with Uncertain Configurations	$217,607
180847	Plasmonic Pixel-Level-Tunable Detector	$397,705
180848	Electromagnetic Propagation and Prediction	$222,513
180850	Using Graphene to Enable Trusted Microelectronics	$218,404
180851	Optical Distortion in the Hypersonic Environment	$48,505
180852	An Ultra-low Size, Weight, and Power Multi-Mission Bi-Static Sensor	$276,394
180853	Advanced Detection and Focusing of "Peak Through" Synthetic Aperture Radar Imagery in Foliage	$291,421
180854	Alumina Materials Chemistry - This is a classified project	$281,837
180855	Meta-Meta-Optimization for Integrated Requirements Development - Optimization methods usually have a number of user-defined parameters that govern the behavior and efficacy of the optimization method. Finding the best choice of these behavioral parameters has previously been done manually by hand-tuning and sometimes using coarse mathematical analysis. But tuning behavioral parame-ters can be considered an optimization problem in its own right and hence solved by an overlaid optimization method	$264,484
180856	Engineering Efficient Human-System Interaction in Defense Systems-of-Systems	$321,090
180857	Trusted Materials using Orthogonal Testing - Sandia is developing Nuclear Enterprise Assurance principles and strategies for enhancing trust in the NNSA supply chain. The potential for undetected, detrimental material changes by the existing specifications dictates that we develop a new testing paradigm to verify that materials are precisely those which are required for their intended purpose. This project intends to prove/disprove that a reasonable number of simple tests can be used to provide a unique data signature for materials, changes in which would serve as a harbinger of material deviation, prompting further evaluations	$238,306
180859	Macro Supply Chain Decision Analytics - Today's global supply chains are intrinsically complex systems that make security and integrity risk difficult to manage. This project will develop analytic methods to construct a bird's-eye view of the supply chain representation, and identify and assess macro-level indicators that could help policy and decision makers make better decisions by addressing the following questions: Who and what are involved in a supply chain? How do changes in policy affect the supply chain security? When is a more in-depth analysis of a specific aspect of a supply chain needed?	$354,699

	United States Department of Energy	
	Laboratory, Plant or Site Directed Research and Development Report	
	Project List -- Fiscal Year 2015	
Project ID	**Project Name**	**FY Total**
180861	Reconfigurable Structure Coupler for Antenna Mode Excitation	$158,675
180862	Advanced Fuel-Injection System for Rapid Control of High-Efficiency Low-Temperature Combustion Engines using Gasoline and other Gasoline-Like Fuels, Including Biofuels	$371,306
180864	Predictive Assessment of State of Health and Life Time of Passive Nuclear Weapons Components	$126,687
180865	Nanocomposite Barrier Films for Enhanced Thin Film Photovoltaic Stability	$284,364
180867	Aggregating Distributed Energy Resources as Secure Virtual Power Plants	$400,992
180869	Multiscale Multiphysics for Subsurface Science and Engineering of Shale	$192,378
180870	Holographic Spectrum Splitting Demonstration System for Duel Photovoltaic and Biofuel Operation	$29,857
180872	Multi-objective Optimization of Solar-Driven, Hollow-Fiber Membrane Distillation Systems	$29,271
180874	Understanding Hot Spot Initiation using Electronic Ultrafast Sum Frequency Spectroscopy	$508,701
180875	Magnetic Sensing to Determine Material Flows within Opaque Vessels	$451,590
180876	Experiments to Elucidate Fundamental Breakup Mechanisms of Molten Components in Shock Driven Flows	$767,859
180877	Developing Strong, Concurrent, Multiphysics, Multiscale Coupling to Understand the Impact of Microstructural Mechanisms on the Structural Scale	$484,176
180878	Multiscale Now! A Novel Hierarchical Approach for Multiscale Structural Reliability Predictions of Ultra-High Consequence Systems	$395,096
180879	A Partial Differential Equation Constrained Optimization Approach for Crack Identification Based on Phase-Field Regularization	$238,599
180880	Exploring the Influence of Microstructural Properties of Heterogeneous Explosives on Performance	$257,883
180881	Process Modeling for Additive Manufacturing	$246,807
180882	Self-Tuning Seismic Sensor Data Processing	$324,628
180883	Novel Method to Characterize and Model the Multiaxial Constitutive and Damage Response of Energetic Materials	$95,590
180884	Revolutionary Size, Water, and Power Capability from Ultra-Wide-Bandgap Power Electronics	$5,042,913
180885	Hardware Acceleration of Adaptive Neural Algorithms for Dynamic and Intelligent Threat Detection	$4,916,300
180889	Towards Representativeness in Emulytics - This project will create a method to conduct information system discovery and develop tools to enable the creation of high-fidelity emulation models that can be used to enable assessment of our infrastructure information system security posture and potential system impacts that could result from cyber threats. Furthermore, this work will help gauge the fidelity of the constructed emulation model, which is critical in providing confidence in research questions answered on this platform	$332,812
180890	Portable Reagent-Free, Label-Free, Early Infectious Disease Signature Detection System	$387,494
180891	Emulation for Cyber-Enabled Physical Attack Scenarios	$421,267
180892	Enhancing Target Delivery and Uptake of Molecular Cargos via Viral Membrane-Fusion Proteins	$49,654
180893	Magnetic Smart Tags for Arms Control and Treaty Verification	$380,911
180896	Understanding Chemical Threat Agent Interaction with Concrete: Critical Step Toward Counter Intelligence Restoration	$251,715
180897	Dual-Particle Imaging System with Neutron Spectroscopy for Safeguard Applications	$42,329
180898	Molecule at Metal Organic Framework: A Study of a New Class of Optoelectronic Materials	$553,487
180899	Compliant Nanoepitaxy: The Next Materials Revolution - The confluence of elastic-strain engineering and nanotechnology places us at the beginning of a new era where nanostructured manipulation of strain in three-dimensions will yield revolutionary new materials solutions. However, emerging research in this area often focuses on rapid application to devices, and not the fundamental materials-science understanding needed to fulfill this concept. This project will fill this knowledge gap via in-depth experimental and theoretical studies of compliant nanoepitaxy, focusing on nanostructure shape, composition, strain, and defect content	$598,446
180900	Engineered Reliability via Intrinsic Thermomechanical Stability of Nanocrystalline Alloys	$575,530
180901	Additive Manufacturing: Predicting the Performance and Reliability of Laser Engineered Materials	$566,512
180902	Improved Mechanical Performance and Reliability of Radical-Cured Thermosets	$240,142

	United States Department of Energy	
	Laboratory, Plant or Site Directed Research and Development Report	
	Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
180906	Magnetic Josephson Junction Memory and 3D Integration for Scalable, High Performance, Low Power Computing	$428,764
180907	Electrochemical Detection of Single Molecules in Nanogap Electrode Fluidic Devices	$502,578
180909	Fluid Polymer Bilayer Matrices: Toward Robust and Field-Deployable Biosensors	$46,807
180919	Atom Traps on a Microfabricated Optical Waveguide Platform for Quantum-Limited Spin-Squeezed Magnetometry and Quantum Information Applications	$573,429
180920	Beyond Graphene: BN-Based Semiconductor Alloys for Next-Generation Optoelectronics	$554,862
180921	Distributed Session Types for Trusted Systems and Communications	$68,296
180922	Controlling Nanoparticle Assembly to Engineer New Materials	$197,324
180923	Emergent Phenomena in Oxide Nanostructures	$221,564
180924	Sandia's Rotary Vapor Compression Cycle Technology: A Pathway to Ultrahigh Efficiency Building Air Conditioning, Heating, and Refrigeration	$248,665
180925	Low Afterglow Scintillators for High-Rate Radiation Detection	$49,792
180926	Direct Mechanical Ignition of Reactive Materials for Improved Safety and Performance	$571,468
180927	Improved Performance of Nuclear Waste Solenoid Alloys by Novel Processing Methods	$75,401
180928	Defect Characterization for Material Assurance in Metal Additive Manufacturing	$528,188
180929	Additive Manufacturing of Porous Materials	$512,929
180930	Microenergetic Logic for Safety Applications	$713,622
180931	Trust of Third Party Digital Design Tools using Formal Methods	$454,012
180932	Compact Models for Defect Diffusivity in Semiconductor Alloys	$479,142
180933	Extending the Accessible Range of Strain Rates on Z using Continuously Graded-Density Flyers Fabricated using Sputter Deposition	$287,238
180934	Bulk Consolidation of Thermodynamically Stable Nanocrystalline Metal Alloys via Cold Spray	$52,333
180935	Measuring Plasma Formation, Field Strength, and Current Loss in Pulsed Power Diodes	$338,624
181060	Predictive Modeling of Aging and Degradation of Materials in Extreme Environments	$54,321
181061	(Active) Learning on Groups of Data with Information-Theoretic Estimators	$42,329
181062	A Domain-Specific Language for Distributed Tensor Computations	$47,562
181063	Study of Complex Power Flow Structures using Self-Consistent Particle-in-Cell Calculations	$252,030
181198	Application of Enhanced Photocurrent Models	$154,579
181202	Optimizing Micro grid Energy Delivery under High Uncertainty	$60,276
181204	Additive Manufacturing of Metallic Components by Laser Powder Forming	$40,301
181205	Lithium Oxysilicate Compounds as Stable Analogs for Understanding Li-P-S High Rate Li-Ion Separators: Moving Solid Electrolytes into High Rate Applications	$68,077
183780	Graph Learning in Knowledge Bases - The goal of this research if to leverage (and advance where necessary) recent advances in state-of-the-art probabilistic knowledge base design and couple them with statistical inference and learning algorithms	$27,329
184022	Solving the Big Data Problem in Advanced Manufacturing - This project supports fundamental research that enhances existing knowledge for the development of scalable analytical methods that transform quality improvement systems for advanced manufacturing (AM). The objective of this research will be to investigate new advanced statistical and data analysis approaches for effectively and efficiently analyzing Big Data collected during advanced manufacturing so that correlations between manufacturing process inputs and resulting part quality and performance can be identified	$30,566
184377	Can Symmetry Transitions of Complex Fields Enable 3D Control of Fluid Vorticity?	$150,070
184516	Enhanced Near-Field Radiative Heat Transfer to a Nanoantenna Coupled Direct Infrared Detector	$49,996
184518	Feasibility of Observing and Characterizing Single Ion Strikes in Microelectronic Components	$49,406
184519	Tunable Graphitic Carbon Nano-Onions Development in Carbon Nanofibers for Multivalent Energy Storage	$38,052
184520	Can Asteroid Airbursts Cause Dangerous Tsunami?	$75,776
184581	Lipid Membrane Coated Alginate Particles: Development of the Surrogate Cell	$50,019
185053	Creating Physically-Based Three-Dimensional Microstructures: Bridging Phase Field and Crystal Plasticity Models	$100,154
185054	Photoelectrochemical Etching of GaN Quantum Wires	$50,547
185268	Development of 3D Nanoscale H2 Evolution Catalysts	$72,101
185269	Super-Sensitive and Robust Biosensors from Supported Polymer Bilayers	$43,782

Project ID	Project Name	FY Total
185270	Exchange Coupled Fe@Co@FePt Nanoparticle Magnets	$47,985
185271	A High-Voltage Cathode for Thermal Batteries	$47,762
185586	Pulsed Laser Effects on Integrated Circuits	$109,321
186113	Visible Quantum Nano photonics - This project will develop a quantum nanophotonics laser architecture in the visible that enables practical control over electrons and photons in more than one dimension	$205,238
186363	Enabling Explosives and Contraband Detection with Neutron Resonant Attenuation	$94,195
186364	Discovery of Anti-Viral Inhibitors Against the Chikungunya Virus nsP2 Protease Domain	$144,123
186366	Sampling-Based Algorithms for Estimating Structure in Big Data	$100,299
186367	Advanced Computational Methods for Thermal Radiative Heat Transfer	$86,176
186839	Validating Hydrogen Concentration Fields at Crack Tips	$99,694
186869	Distributed Sensing - This project will provide a prototype distributed and low-power detection system that is simultaneously sensitive to X-rays and optical photons. If successful, we anticipate this work will provide a generalized sensor design that possesses the highest performance-to-power consumption ration for X-ray detection. The distributed nature of the detection media will also enable facile expansion of the monitored volume	$50,031
186870	A Galerkin Least Squares Approach to Viscoelastic Flow Modeling	$52,685
188023	Sphere-by-Sphere Manufacturing of 3D Microscale Granular Materials	$71,823
188024	Nanoscale-Enabled Piezoelectrically Tunable Optomechanical Photonic Devices	$81,600
188025	General, Physics-Based Predictive Model of Friction and Wear of Metallic Contacts	$52,168
188026	Vertical GaN Pin Diodes with 5 kV Avalanche Breakdown	$108,903
188028	Low-Temperature Exhaust Remediation Based on Metal Organic Framework-Nanoparticle Hybrid Catalysts	$49,448
188029	Partial Differential Equation Constrained Digital Image Correlation	$107,123
188255	Versatile Formal Methods Applied to Quantum Information	$68,301
188256	Adaptive Bayesian Inference for Prediction	$53,438
188288	Vertically-Injected Ultraviolet Laser Diodes	$248,868
188289	Exploring Growth Conditions to Identify, Quantify, and Reduce the Risk of False Negatives	$30,671
188321	Detecting Lateral Movement on Internal Networks	$50,372
188719	Resolving and Measuring Diffusion in Complex Interfaces: Exploring New Capabilities	$82,273
188720	10x Power Capture Increase from Multi-Frequency Nonlinear Dynamic Sources	$88,032
188721	Predictive Modeling of Selective Laser Melting Additive Manufacturing	$69,789
	Total # of Projects for SNL: 380 **Total Cost for SNL:** $145,366,761	
	Total Administrative Cost: $3,468,138	
SRNL - Savannah River National Lab		
LDRD-2013-00016	Long-term, In-situ Monitoring for Subsurface Contaminant Stability	$88,208
LDRD-2013-00029	Spectroscopic Techniques for the Characterization of Particulates from Proliferation Activities	$1,226
LDRD-2013-00092	Structural Integrity of Dual-Purpose Canister for Used Nuclear Fuel Under Extended Storage and Transportation	$7,173
LDRD-2014-00001	Technetium Removal from Alkaline Liquid Waste	$3,745
LDRD-2014-00007	Laser-based methods for ultra-low level isotopic analysis of proliferant materials	$15,968
LDRD-2014-00009	Gas Adsorption Materials and Systems Development	$21,701
LDRD-2014-00011	Electro-Dynamic Particle Sorter	$228,449
LDRD-2014-00012	Stabilization of Radionuclides in Calcium Enriched Environmental Systems	$4,968
LDRD-2014-00014	Novel Ceramic Membranes for the Efficient Utilization of Natural Gas	$291,060
LDRD-2014-00020	Application of Radionuclide Signatures to Short Duration/Pulse Atmospheric Releases	$4,194
LDRD-2014-00028	Functionalized Magnetic Mesoporous Silica Nanoparticles for Uranium and Technetium Removal	$6,401
LDRD-2014-00029	Direct Lithium Electrolysis in a Metallic Lithium Fusion Blanket	$334,936
LDRD-2014-00031	Field detector development for undeclared/declared nuclear testing for treaty verification monitoring	$16,715
LDRD-2014-00041	Detrition and Volume Reduction of Tritium Contaminated Water	$128,156
LDRD-2014-00073	Far Field Modeling Methods for Characterizing Surface Detonations	$81,923
LDRD-2014-00079	Next Generation Betavoltaic Cells – Increasing Power Density	$369,023
LDRD-2014-00096	Selective Electrochemical Extraction	$6,709

	United States Department of Energy Laboratory, Plant or Site Directed Research and Development Report Project List -- Fiscal Year 2015	

Project ID	Project Name	FY Total
LDRD-2014-00097	Reinventing the Nuclear Waste Chemical Processing Flowsheet using Advanced Continuous Chemical Reactors and Separations	$106,418
LDRD-2014-00099	Smart Manufacturing: replacing analytical sample control with model predictive control	$187,425
LDRD-2014-00100	Low Temperature Waste Form Process Intensification	$72,781
LDRD-2014-00116	Reprocessing of Nuclear Fuels using Chromatographic Separations	$4,101
LDRD-2014-00119	Large Particle Titanate Sorbents	$86,037
LDRD-2014-00127	Electrodialysis for Intensification of Aqueous Polishing and Other Separations	$171,164
LDRD-2014-00140	Investigation of On-Line Monitoring Options at H Canyon/HB Line for Plutonium Oxide Production	$99,688
LDRD-2014-00141	Process Intensification to Improve Long-Term Monitoring of Contamination in Groundwater and Reduce Costs	$446
LDRD-2015-00001	Reactive amendment saltstone: a novel approach for improved sorption/retention of radionuclides such as iodine and technetium	$177,288
LDRD-2015-00002	Development of Liquid Phase Water Detritiation Technology	$406,250
LDRD-2015-00005	Alternate Tritium Production Methods Using a Liquid Lithium Target	$174,287
LDRD-2015-00010	Characterization of High Explosives Detonations Via Laser-Induced Plasmas	$381,549
LDRD-2015-00014	Functionalized Magnetic Mesoporous Silica Nanoparticles for U and Tc Removal: Defining Engineering Parameters for Applications	$287,570
LDRD-2015-00015	Laser-Induced Ionization Efficiency Enhancement of a Filament for Thermal Ionization Mass Spectrometer	$187,888
LDRD-2015-00019	Molecular Breeding Algae for Improved Traits for the Conversion of Waste to Fuels and Commodities	$79,944
LDRD-2015-00021	Field Detector Development for Undeclared/declared Nuclear Testing for Treaty Verification Monitoring	$240,863
LDRD-2015-00030	Argon Collection and Purification for Proliferation Detection	$215,105
LDRD-2015-00036	Identification of Mercury Sources in Aquatic Media of Savannah River Site Waters by Isotopic Analysis	$209,925
LDRD-2015-00037	Nanostructured Neutron Conversion Material for Gas-Filled Proportional Detectors	$284,911
LDRD-2015-00040	Magnetically induced heat generation for controlled hydrogen isotope release from nano-hydrides	$367,563
LDRD-2015-00052	Nano-carbon Dyes for Use in Plastic Scintillators	$321,306
LDRD-2015-00055	MAX Phase Materials and Coatings for High Temperature Reactors	$262,105
LDRD-2015-00057	Multi-Component Separation and Purification of Natural Gas	$453,212
LDRD-2015-00058	Graphene-Based Gas Separation Membranes	$334,322
LDRD-2015-00059	Resilient Electrical Grid Syncrophasor	$239,256
LDRD-2015-00062	High Energy Density Supercapacitors from Scalable Edge Rich Graphene	$112,151
LDRD-2015-00068	Using Atmosphere-Forest Flux measurements to Examine the Potential for Reduced Downwind Dose	$41,151
LDRD-2015-00069	Model-Driven Data Analysis of the 2013 H-Canyon Dissolution Experiment	$74,809
LDRD-2015-00070	Characterization of Adsorbent Pairs for Refrigeration/Cooling Systems	$14,898
LDRD-2015-00071	BioAccumulation using Surrogate Samplers : Evaluation of a passive sampler as an alternative monitoring tool for environmental contaminants at the Savannah River Site	$90,313
LDRD-2015-00072	Pu Anion Exchange Process Intensification - This project proposes to create a high throughput Pu anion-exchange column formed through the use of microchannel arrays or highly porous monolithic foam columns	$22,547
LDRD-2015-00075	New Frontiers in Nuclear Particulate Microanalysis and Signature Development	$64,173
LDRD-2015-00076	Validation Study of the SRNL Vacuum Aerosol Contamination Extractor	$42,517
LDRD-2015-00077	In-situ Raman - The objective of this work will be to demonstrate that Raman spectroscopy and chemometrics can be used to monitor reactants and products of the adduct-based synthesis of alane	$66,607
LDRD-2015-00078	Electrorefining of Noble Metal Claddings - The objective of this project is to demonstrate the electrorefining of stainless steel and zirconium alloy cladding that will allow the processing of nuclear materials with no clear disposition pathway	$76,205
LDRD-2015-00079	Sensor Design for Monitoring and Control of Waste Biomass to Methane for Energy Production	$88,909
LDRD-2015-00080	Development of Expandable Heat Exchanger for Enhanced Refueling of Compressed Natural Gas Tanks	$38,060
Total # of Projects for SRNL: 54 **Total Cost for SRNL:** $7,694,299		
Total Administrative Cost: $234,300		

Project ID	Project Name	FY Total
SRP - Savannah River Plant		
SR12022	Tritium Sensor Technology Development Roadmap and Tritium Instrument Demonstration Station	$9,493
SR13001	Continuous Feed Plant Configured Mini-Thermal Cycling Absorption Process	$523,923
SR13035	Initiate Tritium Aging Studies in Lanthanum Nickel Aluminum .85 Hydride	$53,159
SR14008	Degradation Resistant Carbon Nanotube Reinforced Elastomer for Tritium Service	$389,789
SR14012	Development of a Zinc Active Lithium Trap	$147,686
SR14020	Evaluation of the Four Inch Short Hydride Bed	$190,450
SR14023	Glovebox Moisture De-Tritiation by Isotope Exchange	$218,846
SR14024	Graphene Permeation Barrier for the Reduction of Water & Oxygen Flux Through Glovebox Gloves	$466,473
SR14058	Safety Significant Tritium Extraction Facility Tritium Air Monitoring Design	$294
SR15010	Reliable and Maintainable Replacement Oxygen Analyzer	$230,519
SR15011	Aluminum and Other Coatings as Passivation Layer	$156,143
SR15012	Evaluation of Alternate Saes Hydrogen Getters	$232,231
SR15029	Evaluation of Potential Inline Analytical Capabilities	$163,554
	Total # of Projects for SRP: 13 **Total Cost for SRP:** $2,782,560	
	Total Administrative Cost: $84,765	
TJNAF - Thomas Jefferson National Accelerator Facility		
2015-LDRD-01a	Experimental Demonstration of Cooling by a Bunched Electron Beam	$86,388
2015-LDRD-01b	Experimental Studies of Optics Schemes at the Continuous Electron Beam Accelerator Facility for Suppression of Coherent Synchrotron Radiation	$164,511
2015-LDRD-03	Wireless, Hand-Held Data Acquisition System for Imaging Detector	$64,694
2015-LDRD-06	Physics Potential of Polarized Light Ions with Electron Ion Collider at Jefferson Lab	$162,926
2015-LDRD-07	Enhancing Simulation Capability for Electron Cooling in Medium Energy Electron-Ion Collider Project	$127,647
2015-LDRD-10	Development of a Prototype for a Fast Radio Frequency Kicker for the Medium Energy Electron-Ion Collider Electron Cooler	$72,533
	Total # of Projects for TJNAF : 6 **Total Cost for TJNAF :** $678,699	
	Administrative Cost Paid by Laboratory Overhead	
Y-12 - Y-12 Plant		
PD130001	Direct Recycle of Machine Dust	$31,985
PD130002	Zone Refinement of Lithium Hydride	$127,159
PD130007	Calcination of impure Uranyl Nitrate using rotary calciner	$708,480
PD130008	Separation Technology Improvements	$137,786
PD130020	Ultra Violet Raman Spectroscopy Studies	$178,741
PD130021	Determination of hydriding in uranium	$154,587
PD130022	Obsolete Software Replacement	$44,730
PD130023	Salt Conditioning System - Replace the existing salt part conditioning system with a smaller, more reliable system	$142,138
PD130024	Pulse Calibration Method for Mass Spectrometry	$211,416
PD130025	Advanced Modeling of Y-12's Microwave Operations	$195,879
PD130031	Laser Processing Improvements	$185,576
PD130033	Improved Depleted Uranium Welding	$4,685
PD130034	Robust Microwave Insulation - To determine the most robust and efficient ceramic insulation combination for PMW and UPF applications	$783,727
PD130040	Recovery Solution Sampler - Test feasibility of a small modular instrument to sample and dilute surrogate recovery processes solutions by the end of FY13 for application to the production Oxide Dissolver and Product Extraction Feed Evaporator to enable direct processing of extraction feed by the Oxide Dissolver and to validate baseline strategy	$277,969
PD130041	Dual YZ (a numbering convention for reports in the Y-12 Development Organization) Controller Validation	$58,397
PD130042	Coordinate Measuring Machine controller equipment	$520,864
PD130050	Film Replacement MeV Digital Radiography	$199,945
PD141010	Direct Electrolytic Reduction and Electrorefining of Uranium	$2,943,219
PD141020	Distillation / Consolidation of Electrorefining Product	$77,494
PD141040	Small Scale Lithium Compound Drying	$432,685

	United States Department of Energy	
	Laboratory, Plant or Site Directed Research and Development Report	
	Project List -- Fiscal Year 2015	
Project ID	**Project Name**	**FY Total**
PD141070	Determination of Physical Properties I - This task will be focused on filling in remaining gaps in the physical properties databook. These properties include thermal conductivity and heat capacity of solutions and are required for proper design of equipment in the new facility and criticality safety analysis	$137,036
PD141080	Special Material Processing Demonstration	$222,293
PD141090	Red Oil Reactions - The purpose of this task is to evaluate the potential for red oil reactions in operations in which dodecane could be exposed to high temperatures	$52,092
PD142020	Complex surface characterization techniques - Develop and implement techniques for complex characterization of uranium and customer support by summer 2015, to support studies related to uranium production and hydrogen embrittlement reduction	$68,097
PD142030	Corrosion studies of Lithium Hydride	$214,285
PD142040	Advanced Modeling of Y-12's Electrolysis Operations	$165,738
PD142050	Helium Leak Detector Upgrade	$207,852
PD143010	Atomization to Produce Uranium Alloy Powders	$4,588,910
PD143040	Pressure Generators - To develop and demonstrate a method for production of different pressure generating materials for Defense Programs by the end of 2017 for application to the next generation weapon systems	$49,505
PD143050	FY14 Enhanced Alloy Processing in Microwave castings	$122,746
PD144010	Automated Location Tracking of Accountable Items	$52,874
PD144040	Classified Wireless Prototype Implementation for Uranium Processing Facilities Machining	$4,894
PD144050	Microwave Casting Temperature Measurement	$264,887
PD146010	Nano-Pillar Arrays for Optical Detection of Actinides	$71,955
PD147010	Automatic Modulated Tool Path Part Programing	$338,342
PD147020	Develop Coordinate Measuring Machine process utilizing efficient one setup methods	$26,222
PD147040	Interim Machining Capabilities	$611,354
PD148020	Plant Directed Research & Development Technology Fellowship	$288,356
PD15A250	Large Scale Additive Manufacturing Machine & Tooling Evaluation	$53,226
PD15A380	Characterization of Metal and Metal Powder Samples for Additive Manufacturing	$183,648
PD15A540	Additive Machine Tool Install & R&D Testing	$1,207,980
PD15A880	Additive Manufacturing Working Group	$239,967
PD15E610	Mercury Stabilization for Off-Site Disposal	$113,917
PD15E770	Non-Destructive Assay Concrete Corrosion Detection and Transmission Technology	$202,895
PD15F170	Enhanced Programmability for Alpha 1 Machining	$8,128
PD15M300	Productionize Induction Brazing	$65,791
PD15M340	Gas Content in Microwave Melted Castings	$29,044
PD15M650	Residual strains and texture in uranium foil and alloy casting	$249,838
PD15M770	Microwave Consolidation of Chips Without Briquetting	$65,925
PD15N360	Development of New Uranium Quantitative Holdup Equipment & Analysis Software	$265,054
PD15N610	All Optical Determination of Isotopic Enrichment of Actinides	$89,592
PD15N640	Expansion of Aisense Gamma Hotspot Locator Capabilities for Y-12 needs	$90,748
PD15N790	Compact Liquid Stream Monitors for Enriched Uranium	$219,041
PD15N820	Airborne Dust Explosions	$201,322
PD15Q040	Computed Tomography based metrology demonstration	$15,271
PD15Q190	Coded Source Apertures for Low-Dosage Computed Tomography	$249,090
PD15Q210	Understanding Mass Spectrometers for Accurate Measurements	$52,405
PD15Q250	Develop servo card interface for Coordinate Measuring Machine controller	$1,409
PD15Q630	High Precision Isotope Ratios by Femtosecond Laser Induced Breakdown Spectroscop	$88,961
PD15RR00	Rapid Response Plant Directed Research & Development	$52,281
PD15S060	Advanced Thermal Decomposition/Distillation	$211,632
PD15S140	Lithium Purification Chemistry	$239,838
PD15S370	Modern Lithium Crusher	$109,996
PD15S490	Special Material Purification Parameter Study Completion	$18,795
PD15S500	Special Material Process Recovery	$7,167
PD15U450	Dispositioning of Intractable Enriched Uranium Solutions	$105,657
PD15U500	Chip Cleaning - Establish the parameters to be used for implementing the chip cleaning process that will be utilized in 9215 during transition	$127,616
PD15U590	Filter Separate Improvement - Identify and test potential replacements for the single source depth filter currently used in Filter Separate Operations	$35,584
PD15U740	Uranium Processing in Room Temperature Ionic Liquids	$174,571
PD15W570	Strategic Area Movement Detection System	$37,100

Project ID	Project Name	FY Total
	United States Department of Energy **Laboratory, Plant or Site Directed Research and Development Report** **Project List -- Fiscal Year 2015**	
PD15W810	Mobile Exercise Camera System Phase II - The objective of the Mobile Exercise Camera System is to provide assessors Red Force camera feeds during force-on-force training exercises that are centrally located for the conflict and are not assessable to the Blue Force Officers	$34,094
PD15W830	Tactical Wireless Evolution - Evaluate the viability of replacing the Y-12 Motomesh tactical wireless network with a modern Institute of Electrical and Electronic Engineers 802.11AC based wireless data system. Additionally, evaluate the potential for a shared Y-12 security and general use unclassified outdoor wireless network, thereby significantly reducing system costs to Y-12	$57,663
PD15W900	Artificial Neural Network Representation of Critical Excursions - The aim of this project is to build on the success of the initial effort that applied an artificial neural network representation to known criticality excursion experiment data	$78,189
PDX15040	Microwave Technology Supporting Pantex	$33,370
	Total # of Projects for Y-12: 74 **Total Cost for Y-12:** $19,921,705	
	Total Administrative Cost: $927,399	